

R&D GREET Hydrogen Quiz

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Answer these questions using R&D GREET 1, R&D GREET 2, a calculator, and your notes from the session. Bonus questions are extra credit.



GREAT PLAINS
INSTITUTE

Argonne
NATIONAL LABORATORY



U.S. Department of
ENERGY

* Required

* This form will record your name, please fill your name.

1. Complete the equation: [Well to Pump Emissions] = [Feedstock Emissions] x [_____] + [Fuel Emissions]

2. What percentage of carbon is sequestered by default in central NG to gaseous H₂ plants? *

3. How does SMR produce hydrogen? **Bonus question:** what is the share of natural gas used as a feedstock (as opposed to natural gas used for process heat) for the default SMR process in R&D GREET?

4. What material is used as an electrolyte? **Bonus question:** what energy efficiency is used in PEM electrolysis by default in R&D GREET? *

5. What is the default market value of hydrogen in \$/mmBtu used for market value-based allocation? *

6. What is the process fuel used for gaseous hydrogen compression and precooling? *

7. Model a **fuel cell electric vehicle** fueled equally using **gaseous hydrogen** from **SMR (w/ 95% CCS)** and **wind PEM electrolysis** that had to be transported 200 miles to the refueling station via tube trailer. What are the well-to-wheels results in both g CO₂e/MJ and g CO₂e/mile?

8. What is the ammonia lower heating value used in R&D GREET in MJ/kg? *

9. Model **liquefied hydrogen** produced from PEM electrolysis using nuclear energy that will be transported 200 miles via tube trucks. What are the **well-to-pump** GHG emissions results in g CO₂e/mmBtu? *

10. Model **gaseous hydrogen** produced from PEM electrolysis using nuclear energy that will be transported 200 miles via pipeline to a refueling station. What are the **well-to-pump** GHG emissions results in g CO₂e/mmBtu? *

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