

R&D GREET ICEVs, HEVs, PHEVs, EVs, and FCVs Quiz

Feb 7, 2025

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



GREAT PLAINS
INSTITUTE

Argonne
NATIONAL LABORATORY

U.S. Department of
ENERGY

* Required

1. Name *

2. Email *

3. What vehicle powertrain has an internal combustion engine and battery but can run on electric power alone?

- ICEV
- BEV
- HEV
- PHEV
- FCV

4. How are CO₂ emissions from vehicles estimated in R&D GREET? *

Answers will vary* see slide 8 of the On-Road Vehicles Intro slide deck

5. Rank the powertrains modeled in a 2022 sport utility vehicle (SUV) from lowest to highest **feedstock** greenhouse gas (GHG) emissions? *

PHEV (Gasoline and Electricity)

ICEV (Gasoline)

HEV (Gasoline)

BEV (Electricity)

FCV (Gaseous Hydrogen)

FCV > BEV > PHEV > ICEV > HEV

6. Explain why fuel cell vehicles have non-zero feedstock emissions by default in R&D GREET.

Answers will vary* see slide 42 of the On-Road Vehicles Demo slide deck

7. What is the operation all-electric range for a grid-connected SI PHEV passenger car fueled by gasoline by default in R&D GREET? *

34.8 miles

8. What is the default traction battery type for a fuel cell electric vehicle modeled in R&D GREET?

Ni-MH

9. Model a PHEV SUV built and modeled in 2022 running on a NMC811 battery in R&D GREET 2. What are the WTP emissions in g CO₂e/mile? *

159 g CO₂e/mile

10. Model a PHEV passenger **car** built and modeled in 2022 running on a **NMC532** battery in R&D GREET. What are the WTP emissions in g CO₂e/mile? *

97 g CO₂e/mile

11. Model a FCV SUV built and modeled in 2022 fueled by gaseous hydrogen produced from wind-powered electrolysis. Include the embodied emissions of the wind turbine infrastructure. What are the fuel emissions in g CO₂e/mile? *

39 g CO₂e/mile

12. Model a FCV SUV built and modeled in **2015** fueled by gaseous hydrogen produced from wind-powered electrolysis. Include the embodied emissions of the wind turbine infrastructure and **hydrogen production electrolyzer emissions**. What are the fuel emissions in g CO₂e/mile? *

50 g CO₂e/mile

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