

R&D GREET Marine Fuels 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 for extra credit.



GREAT PLAINS
INSTITUTE

Argonne
NATIONAL LABORATORY

U.S. Department of
ENERGY

* Required

1. Name *

2. Email *

3. What fuel used in a bulk vessel in R&D GREET produces the lowest GHG well-to-hull emissions? *

Ammonia with RNG

4. How much natural gas input in Btu is required as material inputs for soy oil extraction per pound of soy oil after allocation? *

373 Btu/lb soy oil

5. What is the default main engine CO₂ emission factor for marine biooil FP (biomass) in R&D GREET in g CO₂ per kWh? *

841 g CO₂/kWh operation

6. What is the pre-defined payload for a **large container vessel** conducting foreign travel in the Pacific region in R&D GREET?

60,076 wet ton

7. What is the default hydrogen requirement for desulfurization for MGO (S 1%->0.1%) in Btu hydrogen/mmBtu MGO? *

8,109 Btu H₂/mmBtu MGO

8. In your own words, describe why pilot oil is used for some marine fuels.

Answers will vary* see slide 7 of the Marine Fuel Intro slide deck

9. What is the default fuel selection for the global cruising trip segment based on the default selected trip?

HFO

10. Within the Marine_WTH tab, what are the seven feedstocks for methanol that can be modeled? **Bonus question:** for the "biomass" feedstock, what is the assumed "biomass" source? *

Natural gas, flare gas, renewable natural gas, biomass, coal, black liquor, eMethanol with hydrogen recycling
Bonus question: Biomass = 100% logging residue

11. Model a Tanker VLCC traveling the pre-defined **domestic route** in the Pacific ocean using straight vegetable oil for the cruise through global waters under the **third** IMO NOx regulation tier. Use the default fuel for all other trip stages. What are the NOx emissions for the fuel combustion stage across the entire stage in kg/trip? *

6,721.91 kg NOx/Trip

12. Model a container-large marine vessel traveling the pre-defined domestic route in the Pacific ocean using **pyrolysis oil** for the cruise through global waters under the **second** IMO NOx regulation tier. Use the default fuel for all other trip stages. What are the NOx emissions for the fuel combustion stage across the entire stage in kg/trip? *

7,462.87 kg NOx/Trip

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