U.S. DEPARTMENT OF
ENERGY

40BSAF-GREET 2024

Frequently Asked Questions

August 2024

Introduction

40BSAF-GREET is the model that has been adopted by the U.S. Department of the Treasury to determine emissions rates for purposes of the Sustainable Aviation Fuel Credit under Title 26 of the U.S. Code, Section 40B. The 40BSAF-GREET 2024 user manual describes the methodology used by 40BSAF-GREET 2024 to calculate life cycle greenhouse gas (GHG) emissions of sustainable aviation fuel (SAF) production under a well-to-gate system boundary and provides instructions on how the model should be used. The 40BSAF-GREET 2024 user manual provides instructions on use of the model.

Frequently asked questions (FAQ) and answers in this document pertain only to the use of the 40BSAF-GREET model. Questions about the 40B tax credit and eligibility for the tax credit should be directed to the Internal Revenue Service.

FAQs will be updated on a continual basis. If you have questions about use of the 40BSAF-GREET model, visit the GREET website for contact information.

Frequently Asked Questions

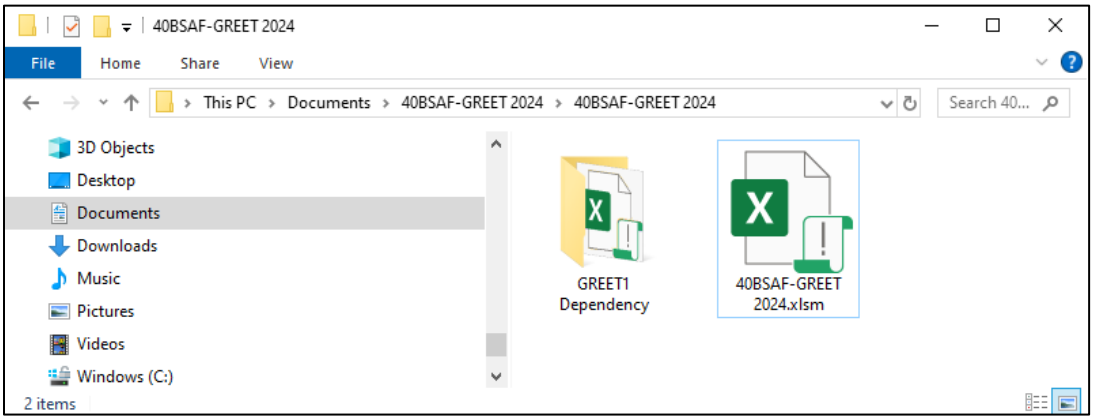
1. **Can 40BSAF-GREET run on an Apple Mac or older versions of Microsoft Excel?**

   40BSAF-GREET was developed for use exclusively with Excel 365 on Windows operating systems. Older versions of Excel and Excel programs for different operating systems, such as macOS, will NOT properly run 40BSAF-GREET.

2. **Do I need to open "GREET1_2023_Rev1.xlsm" in the "GREET1 Dependency" folder?**

   Users should only open the "40BSAF-GREET2024" Excel file. The macros will take care of opening and setting up the link between the two files.

3. **Do I need to move "GREET1_2023_Rev1.xlsm" out of the "GREET1 Dependency" folder?**



   Extracting the "40BSAF-GREET2024" zip file creates a "40BSAF-GREET2024" Excel file and a "GREET1 Dependency" folder which contains "GREET1_2023_Rev1.xlsm." Please do not move the "GREET1_2023_Rev1.xlsm" file out of the "GREET1 Dependency" folder.

4. **Can I rename the files and folders located in the "40BSAF-GREET 2024" folder?**

   We do not recommend changing the names of any files or folders that are part of the unzipped file system, especially the "GREET1 Dependency" folder, and "GREET1_2024" Excel file.

5. **Can I replace "GREET1_2023_Rev1.xlsm" with an older GREET file?**

   Please do not replace the "GREET1_2023_Rev1.xlsm" file that comes with the zip file. Doing so may cause errors and inconsistent results.

6. **"40BSAF-GREET2024.xlsm" does not allow me to enter process information and no error messages are observed. What is the issue?**

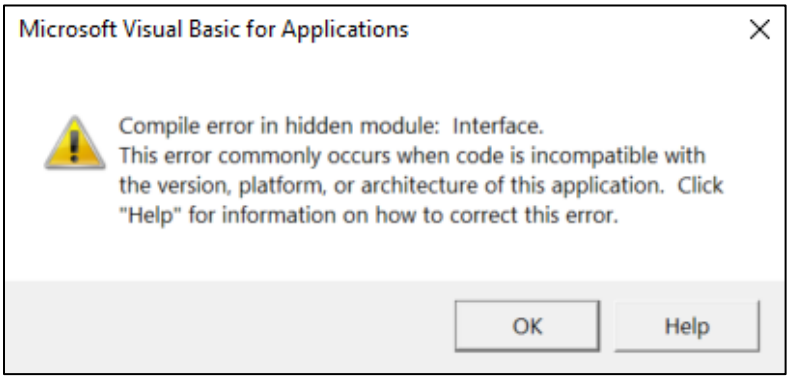
   This could be due to several reasons:

   i. Please ensure that "40BSAF-GREET2024.xlsm" and the "GREET1 Dependency" folder have been extracted into a local drive (e.g., C: or D: drive) and are being run from that drive. The security settings in some cloud drives (e.g., OneDrive) may prevent the execution of macros, so ensure that the folder where "40BSAF-GREET2024.xlsm" is saved does not back up to a cloud drive. Close all open instances of "40BSAF-GREET 2024" and "GREET1_2023_Rev1.xlsm" before trying again.

   ii. Please verify that both the "40BSAF-GREET2024.xlsm" and "GREET1_2023_Rev1.xlsm" files (located in the "GREET1 Dependency" folder) are unblocked and macros are enabled (see FAQ 10). Close all open instances of "40BSAF-GREET2024.xlsm" and "GREET1_2023_Rev1.xlsm" before trying again.

   iii. Please ensure that another file with the filename "GREET1_2024_2023_Rev1.xlsm" is not open. This will prevent "40BSAF-GREET2024.xlsm" from opening the "GREET1_2023_Rev1.xlsm" file required to run its calculations. We recommend closing both files and then opening "40BSAF-GREET2024.xlsm" again.

7. **After I put my data into "40BSAF-GREET2024.xlsm" and click the "Calculate" button, Excel displays the popup error: "Compile error in hidden module: Interface." Why am I receiving this error message?**



   This is because the initial version of "40BSAF-GREET 2024" was designed for the 64-bit version of Office 365, and the user is using the 32-bit version. The latest version of "40BSAF-GREET 2024" currently online is compatible with both the 32-bit and 64-bit versions.

8. **I get the error message "Could not find the GREET_2023_Rev1.xlsm workbook". Why am I receiving this error message?**

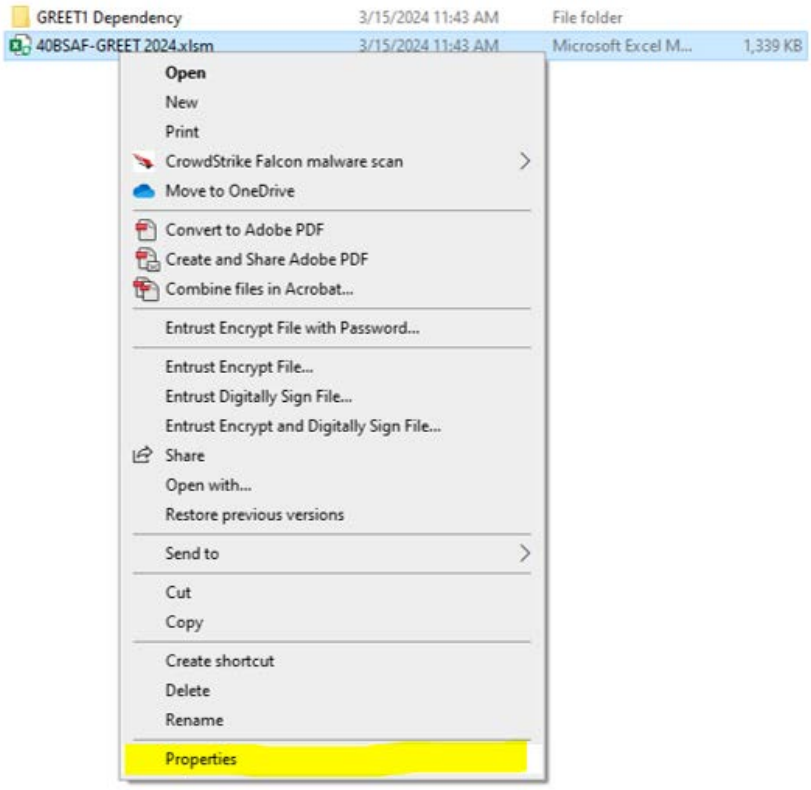
   This error is due to the excel macro not being able to locate "GREET1_2023_Rev1.xlsm" in the "GREET1 Dependency" folder. Please ensure that "40BSAF-GREET2024.xlsm" and the "GREET1 Dependency" folder are in the same folder and that "GREET1_2023_Rev1.xlsm" is in the "GREET1 Dependency" folder. In addition, verify that the file and folder names are correctly named.

9. **After putting all my process data into "40BSAF-GREET2024.xlsm," clicking "Calculate" results in "#NAME?" errors. Why am I seeing these errors?**

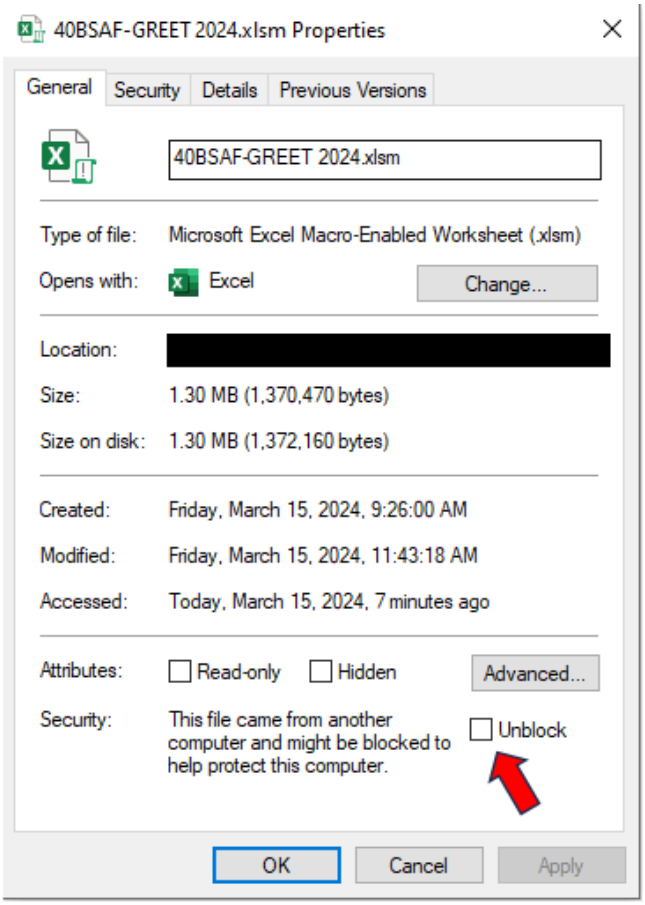
   Please ensure that the Excel version being used is Microsoft 365. "40BSAF-GREET 2024" is not compatible with older versions of Microsoft Excel (Excel 2021, Excel 2019, Excel 2016, etc.).

10. **Upon opening "40BSAF-GREET 2024.xlsm," I see the banner message: "Microsoft has blocked macros from running because the source of this file is untrusted." How do I address this?**

   To correct for this issue, a user must "unblock" "40BSAF-GREET2024.xlsm." To do so, the user should right click on the xlsm file and select "Properties."



Under the "General" tab under "Properties," at the bottom, the user should click in the box "Unblock," then select "Apply." Reopen "40BSAF-GREET 2024.xlsm," and the Security Risk banner should no longer appear.



11. Section 2.6 of the 40BSAF-GREET user manual says that it allows for Renewable Liquefied Propane Gas (LPG) or Renewable Propane coproducts for hydroprocessed esters and fatty acids (HEFA) based pathways, but I don't see an input in the model for Renewable LPG or Renewable Propane (only Renewable Naphtha, Renewable Gasoline, Renewable Diesel). How can I account for Renewable LPG or Renewable Propane coproducts?

The life cycle analysis (LCA) calculation utilizes an energy allocation method to allocate emissions to these co-products, thus 40BSAF-GREET only needs to ensure that the appropriate flow of energy for all co-products is accounted for to calculate a correct LCA result. Renewable LPG and Renewable Propane should be represented through the Renewable Diesel entry co-product based on these lower heating value (LHV) -based energy contents: 122,877 British thermal units/gallon (Btu/gal) for renewable diesel, 84,250 Btu/gal for propane, and 84,950 Btu/gal for LPG. For example, if your HEFA process generates X gallons of LPG and we know that this would be equivalent to the energy of Y (=X * 84950/122,877) gallons of Renewable

Diesel, then enter Y gallons of Renewable Diesel in the cell for gallons of Renewable Diesel corresponding to the LPG.

12. How can I account for multiple feedstocks in my facility when 40BSAF-GREET can only model one feedstock at a time? For example, I operate a HEFA facility where I source both soybean oil and distillers corn oil to make SAF and coproducts.

40BSAF-GREET does not feature the ability to select multiple feedstocks and respective LCA values within one model solution. For a given facility, 40BSAF-GREET should be run separately for each feedstock with a mass-based apportionment of inputs to each feedstock. The final emissions rate should then be based on the average of the emissions rate for each share of fuels. For example, if the total annual production output of a HEFA facility is 100 gallons of SAF in 2024, and the volumes are comprised of 60 gallons corresponding to the soybean oil and 40 gallons corresponding to the tallow, and the 40BSAF-GREET derived emissions rate is X grams (g) CO_2-equivalent CO_2e/megajoule (MJ) for the soybean oil-SAF, and Y gCO_2e/MJ for the Tallow-SAF, then the bottom-line emissions rate is Z gCO_2e/MJ, where Z = X*(60/100) + Y*(40/100).

13. I receive the popup message "Please ensure that every transportation step that has a Share % higher than 0 has a distance value larger than 0" and cannot execute the LCA calculation even though the transport distance for my process is zero (e.g. ethanol does not need to be transported because it is produced on-site at a Corn alcohol-to-jet (ATJ)-ethanol SAF production facility).

If a feedstock is consumed, but its transportation distance is zero, then any transportation mode can be set to 100% with a very small distance (i.e. 1 mile). This will allow the model to run without influencing the Total LCA Results.

14. I receive the popup message "Please ensure that all transportation shares add up to 100% before running the LCA" and cannot execute the LCA calculation when I enter zeros for my shares of *Fossil NG SMR H2* (or *45V Modeled H2)* even though I'm exclusively sourcing *45V Modeled H2* (or *Fossil NG SMR H2*). Why must I enter a transportation share for an input that I am not using? Is my LCA result being improperly calculated?

This condition is an oversight in 40BSAF-GREET, however the requirement to enter transportation shares equal to 100% for *Fossil NG SMR H2 (*or *45V Modeled H2)* **does not** affect the LCA result if you are not consuming *Fossil NG SMR H2 (*or *45V Modeled H2*). If your value of *Fossil derived H2* (or *45V modeled H2*) consumption in the SAF Production section is zero, there will not be any transportation emissions associated with that input.

15. I receive the popup message "Please ensure that every transportation step that has a Share % higher than 0 has a distance value larger than 0" and cannot execute the LCA calculation when I enter zeros for my distances of *Fossil NG SMR H2* (or *45V Modeled H2)* even though I'm exclusively sourcing *45V Modeled H2* (or *Fossil NG SMR H2*). Why must I enter a transportation distance for an input that I am not using? Is my LCA result being improperly calculated?

This condition is an oversight in 40BSAF-GREET, however the requirement to enter transportation distances for all non-zero shares for *Fossil NG SMR H2 (*or *45V Modeled H2)* does not affect the LCA result if you are not consuming *Fossil NG SMR H2 (*or *45V Modeled H2*). If your value of *Fossil Derived H2* (or *45V Modeled H2*) consumption in the SAF Production section is zero, there will not be any transportation emissions associated with that input.

16. What happens if I use multiple transport modes in series for the same transport stage? For instance, what if SAF is transported in the "SAF – From SAF facility to Terminal" first by Rail for 500 miles, then by Heavy-Duty Truck (Tanker) for 50 miles?

The current restriction in 40BSAF-GREET is that the mode-specific shares must add up to 100%. This means that one can't enter 100% Rail AND 100% Heavy-Duty Truck (Tanker) in the model at the same time. However, this limitation can be remedied. If two transportation modes are utilized, enter 50% as the transportation share for each, then double the actual distance to reproduce the same expected emission impacts. So, to model the example above in 40BSAF-GREET, one would enter 50% for Rail and 50% for Heavy-Duty Truck (Tanker) and enter the distances as 1,000 miles and 100 miles, respectively. This surrogate situation calculates the same LCA results as the example provided in the question above. If the feedstock is transported across three different modes, the user should enter each mode as a 33.3% share and triple the distance. If the feedstock is transported across four modes, the user should enter each mode as a 25% share and quadruple the distance, etc.

17. When I open up 40BSAF-GREET, I see the error "There are one or more circular references where a formula refers to its own cell either directly…". Then, when I click "Ok" and run the model, I see "N/A" for D-LCA results. How can I get my model to run correctly?

We have observed this error when a user opens a blank Excel file first before opening 40BSAF-GREET. The solution is to close all Excel files and only open 40BSAF-GREET. Do not open 40BSAF-GREET when other Excel files are already open as this may cause the model not to function properly.

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For more information, visit energy.gov/eere/greet

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