

**Total Energy and Emissions Analysis for Marine Systems(TEAMS) Module for GREET**

The Lab for Environmental Computing and Decision Making

Rochester, New York

**USER GUIDE**

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In this guide we will detail the purpose, and usage of the TEAMS Module developed at the RIT Lab for Environmental Computing and Decision Making. This piece of software is based on the TEAMS Spreadsheet Model, and is adapted to work in conjunction with the 2013 release of Argonne National Laboratory’s “GREET” Model for energy and emissions calculations. The way the software essentially works is that upon its installation, the user is able to define the conditions that dictate how a given nautical vessel will operate. The user will then be given a choice of six different fuels, with a number of pathways for each, and may choose any for both the main and auxiliary engines of the vessel. There will then be generated a number of results for the ship that represent the energy used to power the ship, as well as the emissions that are created in the trip that was defined by the user.

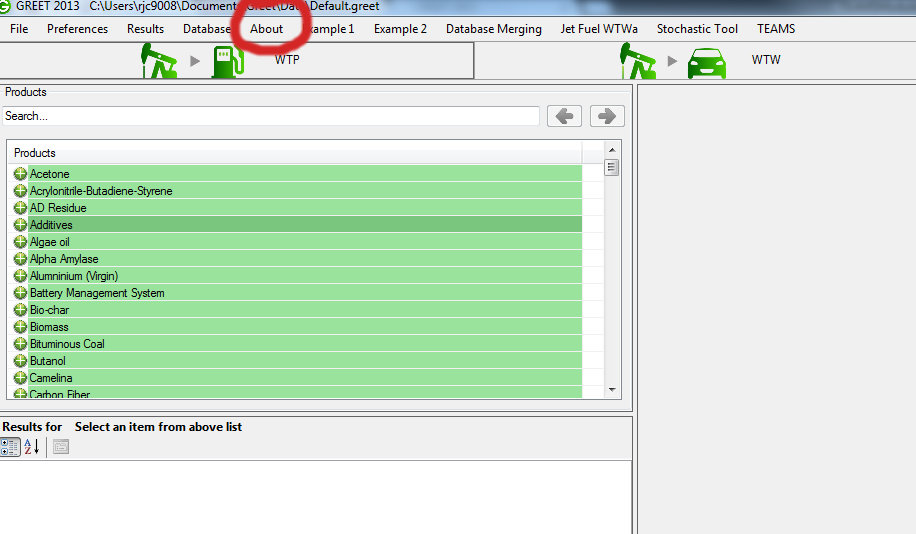
The results are calculated using a combination of formulas that are derived from those in the original TEAMS model, as well as variables pulled from the GREET model on top of which this module sits. In order to edit anything related to the fuel pathways, or variables that rest on the fuel itself (Density, heating Values etc.) you must interact with the GREET interface itself, and then those values will find themselves into the TEAMS module. This software is means to be used as a tool for research of the effects that different combinations of ships, fuels, and pathways can have on the lifecycle emissions and energy usage of a nautical vessel. If a user wishes to change almost any aspect of the process in order to compare results, it is meant to be possible within this module, and easily saved for later viewing.

1. **Installation**

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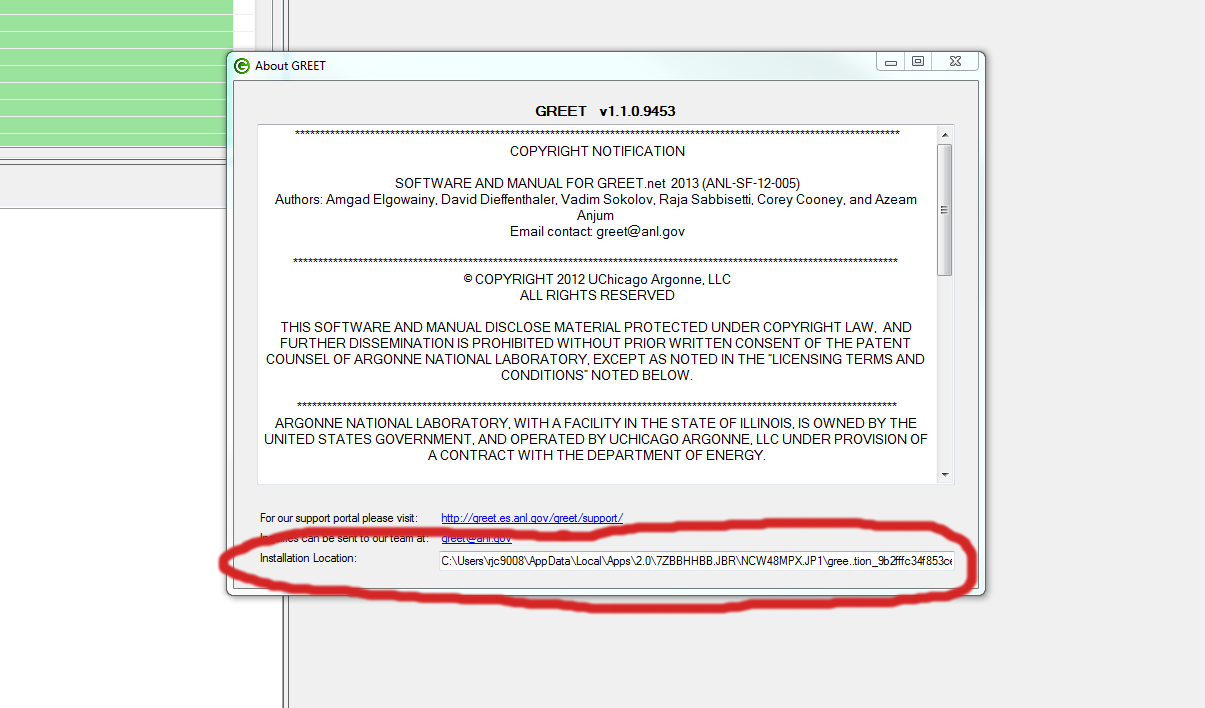
Steps for installing the TEAMS Module for GREET are as follows:

1. Install the .NET version of the GREET Model (Found here <https://greet.es.anl.gov/greet/setup2013/> )
2. After installing GREET, you’re going to need to open up the program and open the “About” tab on the top of the screen. Then click the “About…” button at the bottom of the menu.



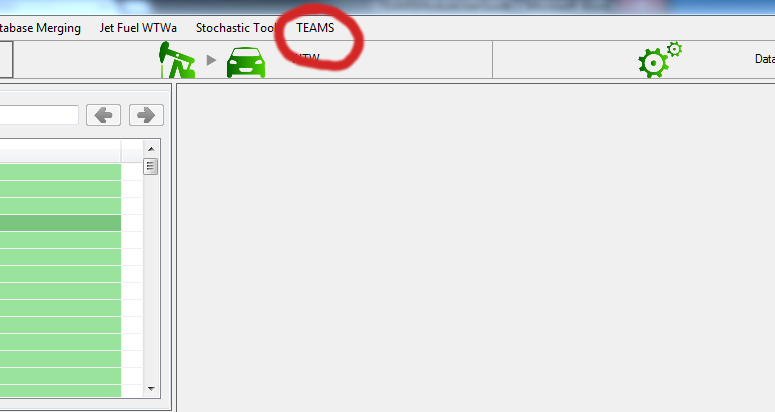
*(Figure 1.1 Shows the GREET program with the “About” tab highlighted)*

1. Once the about menu is open, you will see a string of text you can highlight next to “Installation path.” You should copy this and paste it into your windows explorer in order to open the GREET installation folder. It is important at this point to **CLOSE** the GREET program out, as you cannot install a module while the program is still running.

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*(Figure 1.2 Shows the about menu with the Installation Path highlighted)*

1. Now that you have the installation folder open, you should open a new window for windows explorer and navigate to the folder that contains your downloaded “TEAMS.dll” file, as well as “EPPlus.dll”
2. You now simply copy the two .dll files into the greet folder we opened in step 3, and once they have transferred the installation is complete.
3. In order to check and make sure that the installation was successful, you should run GREET again and there should be a TEAMS tab now located on the toolbar at the top of the screen.



*(Figure 1.3 Shows the TEAMS tab now present on the toolbar)*

1. **User Input Sheet**

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