

To use the CSU_algae_biofuels_model (HEFA model) you must put each of the following files into a single folder. This folder can be anywhere on your computer, and you can name it whatever you want to, but the code requires that all files are in the same folder. Also, **you should have separate folders for the HTL and HEFA models.**

Required Files for the HEFA model:

- All files contained in the HEFA branch of the data repository found through this link (GitHub): https://github.com/jonahgreene01/CSU_algae_fuels_model/tree/HEFA
- The “Merger” folder which contains all weather station data found through this link (Google Drive): https://drive.google.com/drive/folders/15i6FB_46SpMV6J7IG36U82KxgUVbyXGz?usp=sharing

Once everything has been consolidated the final folder should look like this:

This PC > Windows 10 (C:) > Jonah_Work > ALGAE SOT PAPER > 2024 Manuscript and Models > Final Models in Matlab > Final SAF Model				
<input type="checkbox"/> Name	Date modified	Type	Size	
Merger	5/8/2024 12:43 PM	File folder		
Air_Properties	8/3/2022 11:01 AM	MATLAB Code	1 KB	
All_Counties_Outputs_SAF_v3	10/30/2024 8:30 AM	Microsoft Excel M...	3,415 KB	
background_data	5/7/2024 5:14 PM	MATLAB Data	11,602 KB	
Concentration_Efficiency_ORP	2/7/2024 12:18 PM	MATLAB Code	1 KB	
Convection_HT_ORPV3	8/3/2022 11:01 AM	MATLAB Code	3 KB	
cultivation_fcn	5/3/2024 9:34 AM	MATLAB Code	29 KB	
Cultivation_TEA_fcn	5/31/2024 10:21 AM	MATLAB Code	24 KB	
Direct_Solar_HT_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
EvaporationV2	8/3/2022 11:01 AM	MATLAB Code	5 KB	
fractions	8/11/2017 10:44 PM	MATLAB Code	1 KB	
Ground_ConductionV2	8/3/2022 11:01 AM	MATLAB Code	1 KB	
Inflow_HT_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
Integrated_SAF_Model_All_Counties_v3	10/30/2024 8:30 AM	MATLAB Live Script	35 KB	
Integrated_SAF_Model_Single_County_v3	7/24/2024 9:26 AM	MATLAB Live Script	47 KB	
Integrated_SAF_Model_Single_County_v3_Optimization	10/31/2024 11:48 AM	MATLAB Live Script	41 KB	
Integrated_SAF_Model_Single_County_v3_Sensitivity	11/11/2024 1:45 PM	MATLAB Live Script	40 KB	
Integrated_SAF_Model_Single_County_v3_Ternary_Plots	11/11/2024 1:13 PM	MATLAB Live Script	75 KB	
Integrated_SAF_Model_Single_County_v3_TRACI	6/4/2024 12:42 PM	MATLAB Live Script	35 KB	
LCA_SAF_ext	6/10/2024 7:13 AM	MATLAB Code	18 KB	
LCA_SAF_HM_v3	5/8/2024 12:28 PM	MATLAB Code	18 KB	
Light_Efficiency_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
Longwave_Atmo_HT_ORPV4	8/3/2022 11:01 AM	MATLAB Code	1 KB	
Night_Respiration_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
NPV_MBSP	6/5/2023 1:35 PM	MATLAB Code	5 KB	
NPV_MFSP	6/5/2023 1:35 PM	MATLAB Code	6 KB	
Reradiation_HT_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
SAF_Optimization_Outputs_v3	10/31/2024 11:48 AM	Microsoft Excel M...	14 KB	
SAF_production_fcn	10/29/2024 1:43 PM	MATLAB Code	58 KB	
SAF_TRACI_panel_v3	6/4/2024 12:42 PM	Microsoft Excel M...	19 KB	
Single_Run_Outputs_SAF_v3	6/4/2024 12:10 PM	Microsoft Excel M...	335 KB	
Single_Run_Outputs_SAF_v3_Sensitivity	11/11/2024 1:45 PM	Microsoft Excel M...	53 KB	
Storage_fcn	5/3/2024 9:38 AM	MATLAB Code	7 KB	
Temp_Efficiency_ORP	8/3/2022 11:01 AM	MATLAB Code	1 KB	
ternaxes	1/28/2021 8:33 PM	MATLAB Code	4 KB	
terncontour	1/28/2021 8:34 PM	MATLAB Code	3 KB	
terncoords	1/28/2021 8:12 PM	MATLAB Code	2 KB	
ternlabel	1/28/2021 8:37 PM	MATLAB Code	1 KB	
ternpcolor	8/11/2017 10:44 PM	MATLAB Code	1 KB	
thermal_fcnV6	5/11/2023 3:47 PM	MATLAB Code	7 KB	
weather_finder	4/30/2024 3:27 PM	MATLAB Code	1 KB	

Once you have placed all required files into a single model folder (that looks like the picture on the previous page) you can run the model using one of the user interface live scripts described below:

1. **Integrated_SAF_Model_Single_County_v3.mlx**: Use this code to get comprehensive TEA and LCA results for a single county in the contiguous US or Hawaii. All inputs can be configured within the live script. Also, the user can view results through the live script or by printing to the Excel sheet: **Single_Run_Outputs_SAF_v3.xlsm**
2. **Integrated_SAF_Model_Single_County_v3_Optimization.mlx**: Use this code to run the optimization algorithm for a single county in the contiguous US or Hawaii. All inputs can be configured within the live script. Also, the user can view results through the live script or by printing to the Excel sheet: **SAF_Optimization_Outputs_v3.xlsm**
3. **Integrated_SAF_Model_Single_County_v3_Sensitivity.mlx**: Use this code to run the sensitivity analysis for a single county in the contiguous US or Hawaii. All inputs can be configured within the live script. Within the live script, results can be printed to the Excel sheet: **Single_Run_Outputs_SAF_v3_Sensitivity.xlsm**
4. **Integrated_SAF_Model_Single_County_v3_Ternary_Plots.mlx**: Use this code to run the compositional analysis for a single county in the contiguous US or Hawaii. All inputs can be configured within the live script. The code generates ternary diagrams which can be copied and pasted out of Matlab. This code does not print to Excel.
5. **Integrated_SAF_Model_Single_County_v3_TRACI.mlx**: Use this code to generate environmental impacts from the Tool for the Reduction of Chemical and Other Environmental Impacts (TRACI) methodology for 5 case study locations. The user can print outputs to the Excel sheet: **SAF_TRACI_panel_v3.xlsm**
6. **Integrated_SAF_Model_All_Counties_v3.mlx**: Use this code to run the model in each of the 5,626 locations included in the weather grid within the “Merger” file. This will generate an output matrix with key LCA and TEA results metrics that is saved to the Excel file: **All_Counties_Outputs_SAF_v3.xlsm**