

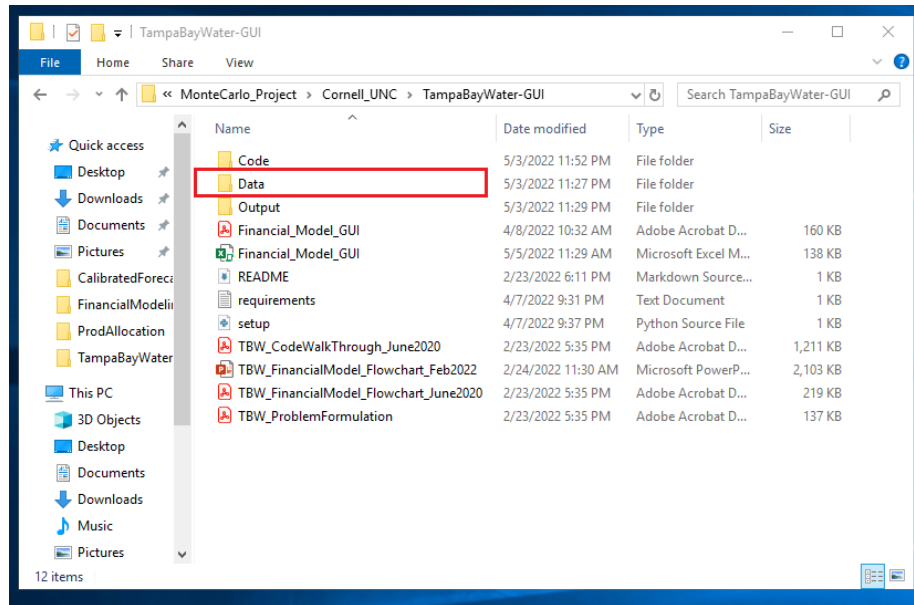
## Financial Model GUI QuickStart Guide

*Brown indicates items where references to the User Manual and Documentation PDF may be required.*

**\*For inquiries, changes, updates or errors, please contact Lillian Lau ([lbl59@cornell.edu](mailto:lbl59@cornell.edu))**

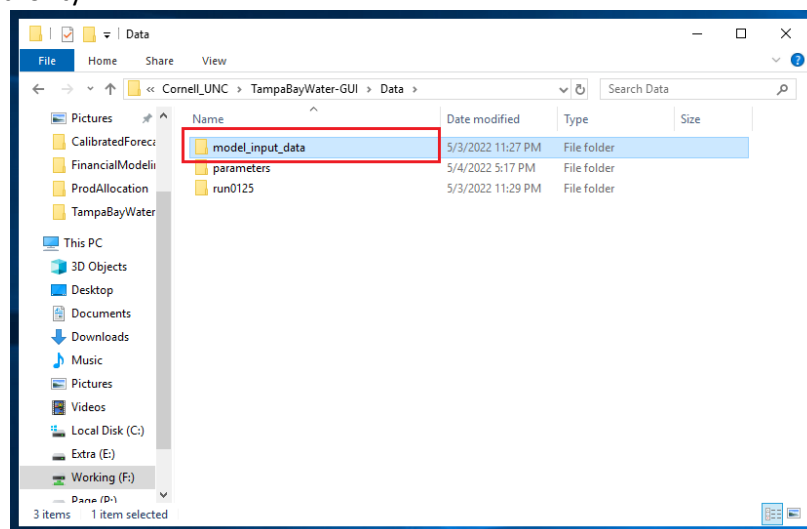
### Obtaining and organizing current data

1. Navigate to F:\MonteCarlo\_Project → Cornell\_UNC → TampaBayWater-GUI
2. Locate the 'Data' folder



3. Navigate to Data → model\_input\_data

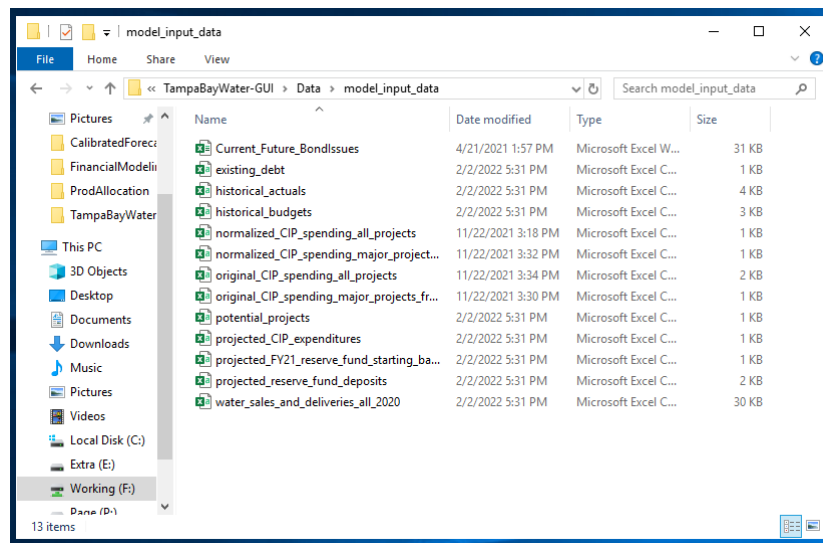
This folder contains all the historical and projected financial data as provided by Tampa Bay Water Authority



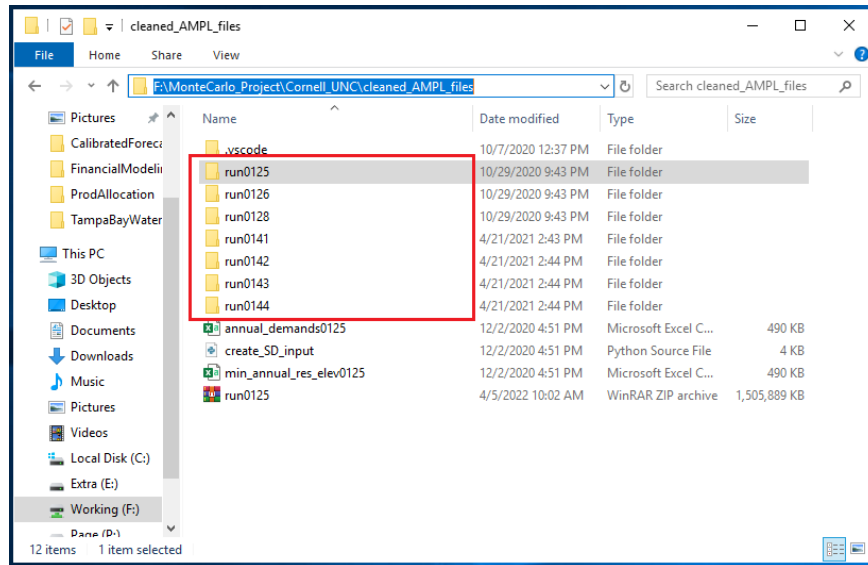
4. The formatting, creation and naming convention of each file can be found in the user manual.

The following files should be stored within this current folder (reference figure below):

- a. Previous year water sales and deliveries
- b. Historical estimated budgets
- c. Historical estimated budgets
- d. Existing debt
- e. Potential projects
- f. Current and future bond issues
- g. Original CIP spending (all projects)
- h. Original CIP spending (major projects)
- i. Normalized CIP spending (all projects)
- j. Normalized CIP spending (major projects)
- k. Projected reserve fund starting balance
- l. Projected reserve fund deposits



5. Next, navigate to F:\MonteCarlo\_Project→ Cornell\_UNC→ cleaned\_AMPL\_files  
Copy the 'runXXXX' folder.



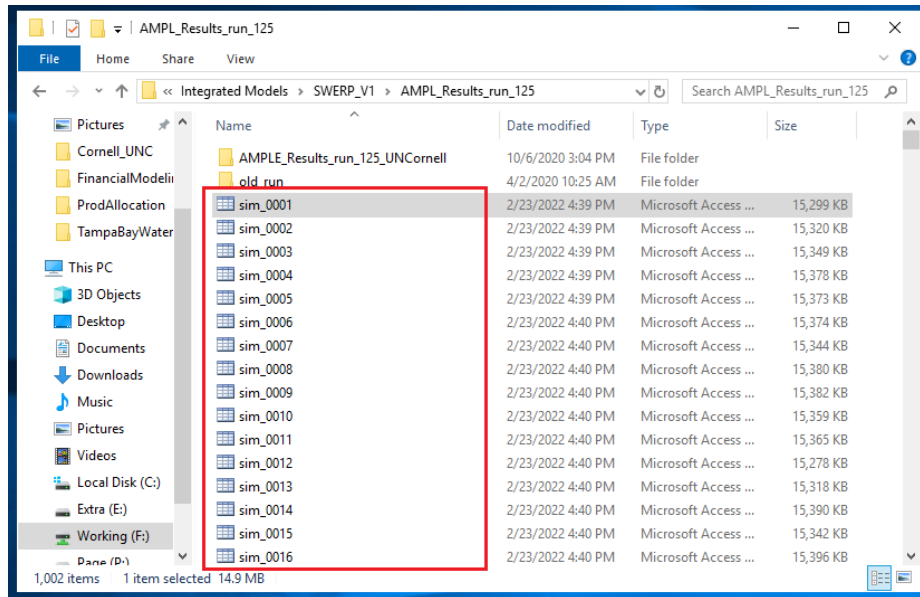
The description and explanation as to the selection and function of the 'runXXXX' folder can be found in the user manual.

Navigate back to F:\MonteCarlo\_Project → Cornell\_UNC → TampaBayWater-GUI → Data and paste the copied 'runXXXX' folder in the current folder.

6. Navigate to F:\MonteCarlo\_Project → FNAIL → IM to Tirusew → Integrated Models → SWERP\_V1 → AMPL\_Results\_run\_125

Copy the desired financial scenario files, named 'simXXXX.mat'.

Navigate back to F:\MonteCarlo\_Project → Cornell\_UNC → TampaBayWater-GUI → Data → runXXXX and paste the copied 'simXXXX.mat' file in the current folder.

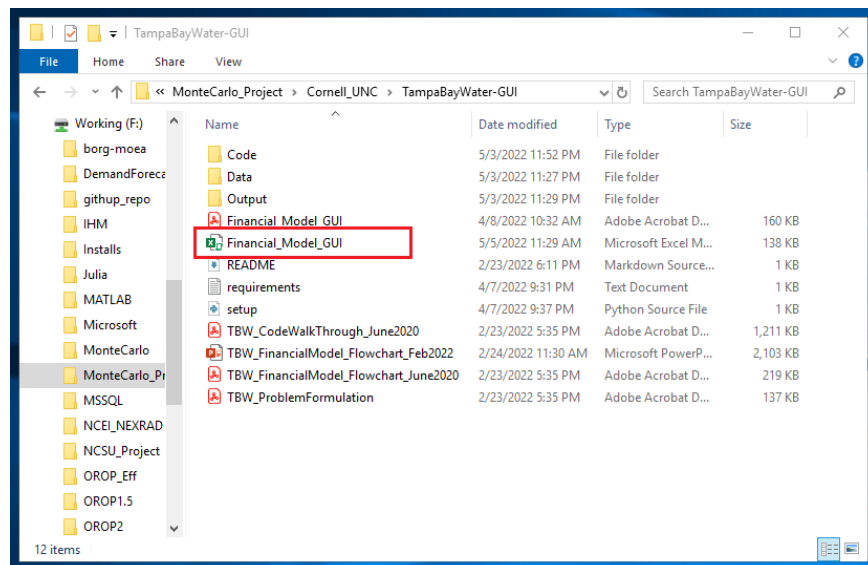


The description and explanation as to the selection and function of the 'simXXXX.mat' file can be found in the user manual.

7. Now, navigate to F:\MonteCarlo\_Project → Cornell\_UNC → TampaBayWater-GUI → Output and create the following folders:
  - a. error\_files
  - b. financial\_model\_results
  - c. output\_figures

## Model setup and running the GUI

1. Navigate to F:\MonteCarlo\_Project → Cornell\_UNC → TampaBayWater-GUI and locate the Financial\_Model\_GUI.xlsm file



- In the Financial\_Model\_GUI.xlsm file, navigate to '1-Setup'  
Click on 'SETUP FINANCIAL MODEL'.  
This will install all the necessary software to run the Financial Model.

**Step 1 - Load Financial Model input files**

Copy and paste the names of all the files required for the financial model. Their descriptions can be found under 'File Description'.

Files to upload		Figures to plot
File description	Model Input .csv file names	
Previous year water sales and deliveries	water_sales_and_deliveries_all_2020.csv	Rate Covenant Ratio
Historical estimated budgets	historical_budgets.csv	Debt Covenant Ratio
Historical actual budgets	historical_actuals.csv	Debt Service
Existing debt	existing_debt.csv	Debt Service Deferred
Potential projects	potential_projects.csv	Uniform Rate
Current and future bond issues	Current_Future_BondIssues.xlsx	Remaining Unallocated Deficit
Original CIP spending (all projects)	original_CIP_spending_all_projects.csv	Utility Reserve Fund Balance (Total)
Original CIP spending (major projects)	original_CIP_spending_major_projects_fraction.csv	Rate Stabilization Fund (Total)
Normalized CIP spending (all projects)	normalized_CIP_spending_all_projects.csv	CIP Fund (Total)
Normalized CIP spending (major projects)	normalized_CIP_spending_major_projects_fraction.csv	R&R Fund (Total)
Projected reserve fund starting balance	projected_FY21_reserve_fund_starting_balances.csv	Energy Savings Fund (Total)
Projected reserve fund deposits	projected_reserve_fund_deposits.csv	

**SETUP FINANCIAL MODEL**

**Scenario-defining files**  
 financial\_model\_DVs.csv  
 financial\_model\_DUfactors.csv



- [THIS NEXT SERIES OF STEPS IS OPTIONAL]  
*If you would like to generate one or a set of alternative financial scenarios, please continue to read. Otherwise, skip to Step 4.*

Navigate to '2-Gen alt scenarios'. This step generates one or a set of alternative financial scenarios.

If you would like to generate only ONE new scenario

In the column labeled 'Upper', enter your desired value, or select Yes/No.

Leave the values in the column labeled 'Lower' as zero.

Descriptions for each of the parameter names listed and a range of their reasonable values can be found in the user manual.

**Step 2 - Generate alternative scenarios**

Only modify if you would like to generate an alternative scenario, or a range of different scenarios that is different from the default scenario already provided.

Financial scenario parameter bounds	Lower	Upper	Financial decision bounds	Lower	Upper
Rate stabilization min ratio	0	1	Covenant threshold, net revenue and fund balance	0	1
Rate stabilization max ratio	0	0.5	Debt covenant required ratio	0	0.3
Variable operational cost fraction	0	1	Keep uniform rate stable		Yes
Unencumbered budget fraction	0	0.5	Managed uniform rate increase rate	0	0.6
Annual budget fixed OPEX inflation rate	0	1	Managed uniform rate decrease rate	0	0.7
Annual demand growth rate	0	0.5	Previous unaccounted FY enterprise fund fraction	0	0.05
Next FY budgeted TBC delivery	0	1	Debt service cap fraction of GR	0	0.6
Fixed OPEX factor	0	0.5	R&R fund fraction of GR	0	0.7
Variable OPEX factor	0	1	CIP fund fraction of GR	0	0.05
Non-sales revenue factor	0	0.5	Energy fund fraction of GR	0	0.3
Rate stabilization transfer factor	0	1	RF fund fraction of GR	0	0.3
R&R transfer factor	0	0.5			
Other transfer factors	0	1			
Required CIP factor	0	0.5			
Annual budget variable OPEX inflation rate	0	0.5			
TBW sales threshold fraction	0	1			
Energy transfer factor	0	0.5			
URF deficit reduction fraction	0	1			
Follow CIP Schedule		No			
Flexible CIP Spending		No			

README	1-Setup	<b>2-Gen alt scenarios</b>	3-Run Model	DRAFT-Glossary	+	
--------	---------	----------------------------	-------------	----------------	---	--

If you would like to generate A RANGE of new scenarios

In the column labeled 'Lower', enter your desired lower bound value.

**IMPORTANT:** Do NOT enter values in the cells that are crossed.

In the column labeled 'Upper', enter your desired upper bound value, or select Yes/No.

Descriptions for each of the parameter names listed and a range of their reasonable values can be found in the user manual.

**Step 2 - Generate alternative scenarios**

Only modify if you would like to generate an alternative scenario, or a range of different scenarios that is different from the default scenario already provided.

Financial scenario parameter bounds	Lower	Upper	Financial decision bounds	Lower	Upper
Rate stabilization min ratio	0.1	1	Covenant threshold, net revenue and fund balance	0.05	1
Rate stabilization max ratio	0.1	0.5	Debt covenant required ratio	0.15	0.3
Variable operational cost fraction	0.1	1	Keep uniform rate stable	Yes	
Unencumbered budget fraction	0.1	0.5	Managed uniform rate increase rate	0.1	0.6
Annual budget fixed OPEX inflation rate	0.1	1	Managed uniform rate decrease rate	0.1	0.7
Annual demand growth rate	0.1	0.5	Previous unaccounted FY enterprise fund fraction	0.1	0.05
Next FY budgeted TBC delivery	0.1	1	Debt service cap fraction of GR	0.1	0.6
Fixed OPEX factor	0.1	0.5	R&R fund fraction of GR	0.1	0.7
Variable OPEX factor	0.1	1	CIP fund fraction of GR	0.1	0.05
Non-sales revenue factor	0.1	0.5	Energy fund fraction of GR	0.1	0.3
Rate stabilization transfer factor	0.5	1	RF fund fraction of GR	0.1	0.3
R&R transfer factor	0.1	0.5			
Other transfer factors	0.1	1			
Required CIP factor	0.1	0.5			
Annual budget variable OPEX inflation rate	0.1	0.5			
TBW sales threshold fraction	0.02	1			
Energy transfer factor	0.1	0.5			
URF deficit reduction fraction	0.1	1			
Follow CIP Schedule	Yes				
Flexible CIP Spending	No				

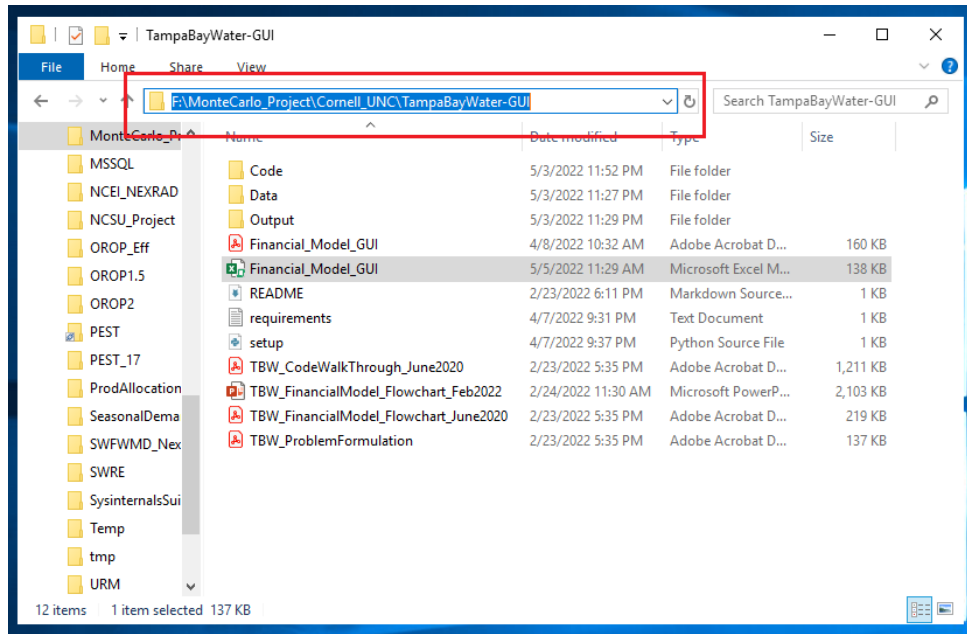
## 4. Navigate to '3-Run Model'

Step 4-1

- Identify the location of the TampaBayWater-GUI main folder.
- This can be done by clicking on the folder icon of the address bar of the TampaBayWater-GUI folder as shown below:

# Tampa Bay Water Authority Financial Model GUI QuickStart Guide

Author: Lillian B. Lau (lb159@cornell.edu)



c) Copy the location and paste it in the cell adjacent to 'Main Folder Location'.

## Step 3 - Run the Financial Model

Runs the financial model. Generates financial files and their associated figures that describe projected funds in each fund given a (set of) scenario(s).

**Step 3-1**

Main Folder Location: F:\MonteCarlo\_Project\Cornell\_UNC\TampaBayWater-GUI

**Step 3-2**

Folder	File description	Filename	Loaded?
model_input_data	Previous year water sales and deliveries	water_sales_and_deliveries_all_2020.csv	Yes
	Historical estimated budgets	historical_budgets.csv	Yes
	Historical actual budgets	historical_actuals.csv	Yes
	Existing debt	existing_debt.csv	Yes
	Potential projects	potential_projects.csv	Yes
	Current and future bond issues	Current_Future_BondIssues.xlsx	Yes
	Original CIP spending (all projects)	original_CIP_spending_all_projects.csv	Yes
	Original CIP spending (major projects)	original_CIP_spending_major_projects_fraction.csv	Yes
	Normalized CIP spending (all projects)	normalized_CIP_spending_all_projects_fraction.csv	Yes
	Normalized CIP spending (major projects)	normalized_CIP_spending_major_projects_fraction.csv	Yes
parameters	Projected reserve fund starting balance	projected_FY21_reserve_fund_starting_balances.csv	Yes
	Projected reserve fund deposits	projected_reserve_fund_deposits.csv	Yes
	Division variables	financial_model_DVs.csv	Yes
	DU factors	financial_model_DUfactors.csv	Yes

**Step 3-3**

**TBW Model runs**

TBW Model runs	TBWruns
Run Number	0
Run ID	125
Starting FY	2021
Ending FY	2040
Num realizations	120
Num simulations	1

Run default scenarios?

Explore one new scenario

Explore a range of scenarios

**Step 3-4**

OUTPUT FILE: financial\_model\_results

**KEY OUTPUT PLOTS**

Data to plot: Energy Savings Fund (Total)

**ERRORS**

Navigate to Financial\_Model\_Output/error\_files/ to check for error messages

**OUTPUT FIGURE**

Navigate to Financial\_Model\_Output/output\_figures/ to check for the figure you have chosen to plot

**LEGEND**

- Select dropdown
- Do not modify
- Fill with integer values only
- Select figure to plot

README | 1-Setup | 2-Gen alt scenarios | **3-Run Model** | DRAFT-Glossary

## Step 4-2

a) In the column labeled 'Filename', select from the dropdown list each filename that corresponds to their description in the adjacent 'File description' column.



**Step 3-2**

Folder	File description	Filename	Loaded?
model_input_data	Previous year water sales and deliveries	water_sales_and_deliveries_all_2020.csv	<input type="checkbox"/>
	Historical estimated budgets	historical_estimated_budgets.csv	<input type="checkbox"/>
	Historical actual budgets	historical_actuals.csv	<input type="checkbox"/>
	Existing debt	existing_debt.csv	<input type="checkbox"/>
	Potential projects	potential_projects.csv	<input type="checkbox"/>
	Current and future bond issues	Current_Future_BondIssues.xlsx	<input type="checkbox"/>
	Original CIP spending (all projects)	original_CIP_spending_all_projects.csv	<input type="checkbox"/>
	Original CIP spending (major projects)	original_CIP_spending_major_projects_fraction.csv	<input type="checkbox"/>
	Normalized CIP spending (all projects)	normalized_CIP_spending_all_projects.csv	<input type="checkbox"/>
	Normalized CIP spending (major projects)	normalized_CIP_spending_major_projects_fraction.csv	<input type="checkbox"/>
	Projected reserve fund starting balances	projected_FY21_reserve_fund_starting_balances.csv	<input type="checkbox"/>
	Projected reserve fund deposits	projected_reserve_fund_deposits.csv	<input type="checkbox"/>
parameters	Decision variables	financial_model_DVs.csv	<input checked="" type="checkbox"/>
	DU factors	financial_model_DUfactors.csv	<input checked="" type="checkbox"/>

- b) Check if the files have been uploaded into TampaBayWater-GUI/Data/model\_input\_data.  
 c) If the file is present in the folder, select 'Yes' for each file.

**Step 3-2**

Folder	File description	Filename	Loaded?
model_input_data	Previous year water sales and deliveries	water_sales_and_deliveries_all_2020.csv	<input checked="" type="checkbox"/>
	Historical estimated budgets	historical_estimated_budgets.csv	<input checked="" type="checkbox"/>
	Historical actual budgets	historical_actuals.csv	<input checked="" type="checkbox"/>
	Existing debt	existing_debt.csv	<input checked="" type="checkbox"/>
	Potential projects	potential_projects.csv	<input checked="" type="checkbox"/>
	Current and future bond issues	Current_Future_BondIssues.xlsx	<input checked="" type="checkbox"/>
	Original CIP spending (all projects)	original_CIP_spending_all_projects.csv	<input checked="" type="checkbox"/>
	Original CIP spending (major projects)	original_CIP_spending_major_projects_fraction.csv	<input checked="" type="checkbox"/>
	Normalized CIP spending (all projects)	normalized_CIP_spending_all_projects.csv	<input checked="" type="checkbox"/>
	Normalized CIP spending (major projects)	normalized_CIP_spending_major_projects_fraction.csv	<input checked="" type="checkbox"/>
	Projected reserve fund starting balances	projected_FY21_reserve_fund_starting_balances.csv	<input checked="" type="checkbox"/>
	Projected reserve fund deposits	projected_reserve_fund_deposits.csv	<input checked="" type="checkbox"/>
parameters	Decision variables	financial_model_DVs.csv	<input checked="" type="checkbox"/>
	DU factors	financial_model_DUfactors.csv	<input checked="" type="checkbox"/>

### Step 4-3

- a) Fill in the table corresponding to Step 3-3 as shown below:

**Step 3-3**

TBW Model runs	TBWruns
Run Number	0
Run ID	125
Starting FY	2021
Ending FY	2040
Num realizations	120
Num simulations	1
Run default scenarios?	<input checked="" type="checkbox"/> GENERATE DEFAULT SCENARIO
Explore one new scenario	<input checked="" type="checkbox"/> GENERATE ONE NEW SCENARIO
Explore a range of scenarios	<input checked="" type="checkbox"/> GENERATE RANGE OF SCENARIOS

Descriptions for each of the parameter names and items in the table can be found in the user manual.

b) To generate the desired type of scenario:

- To generate the default financial scenario: Click on 'GENERATE DEFAULT SCENARIO'
- To generate one alternative financial scenario: Click on 'GENERATE ONE NEW SCENARIO'
- To generate a range of alternative financial scenarios:
  - Click on 'GENERATE ONE NEW SCENARIO'
  - **IMPORTANT:** This option will only run if 'Num simulations' is more than 1. Otherwise, an error message will be printed in the 'TampaBayWater-GUI/Output/error\_files/err\_generate\_scenarios.txt' file

#### Step 4-4

a) Click on 'RUN MODEL' to run the model using the scenario(s) generated.

**Step 3-4**

OUTPUT FILE
financial\_model\_results

**RUN MODEL**

**KEY OUTPUT PLOTS**

Data to plot

Uniform Rate

**PLOT**

**ERRORS**

Navigate to Financial\_Model\_Output/error\_files/ to check for error messages

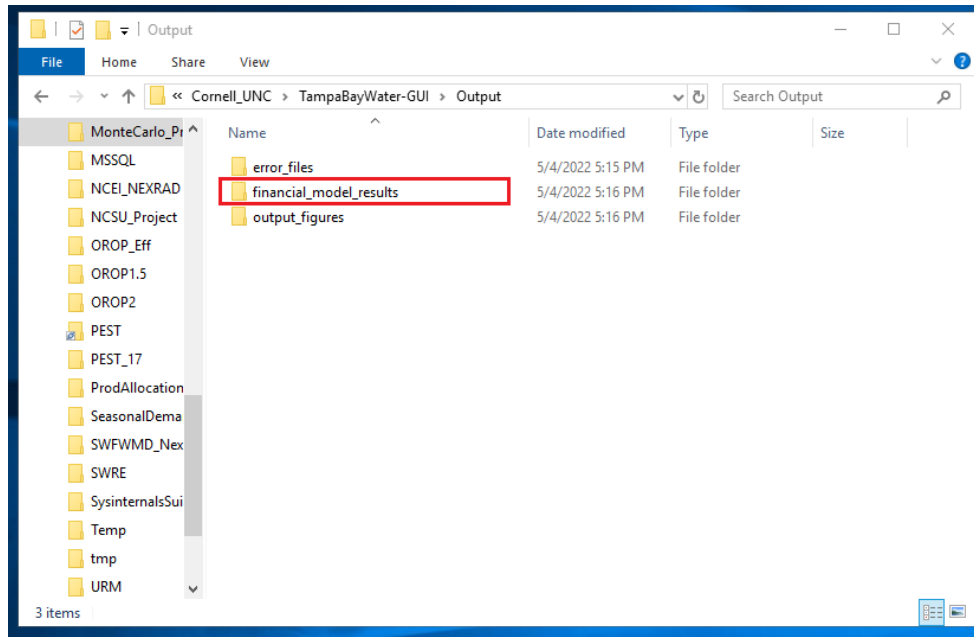
**OUTPUT FIGURE**

Navigate to Financial\_Model\_Output/output\_figures/ to check for the figure you have chosen to plot

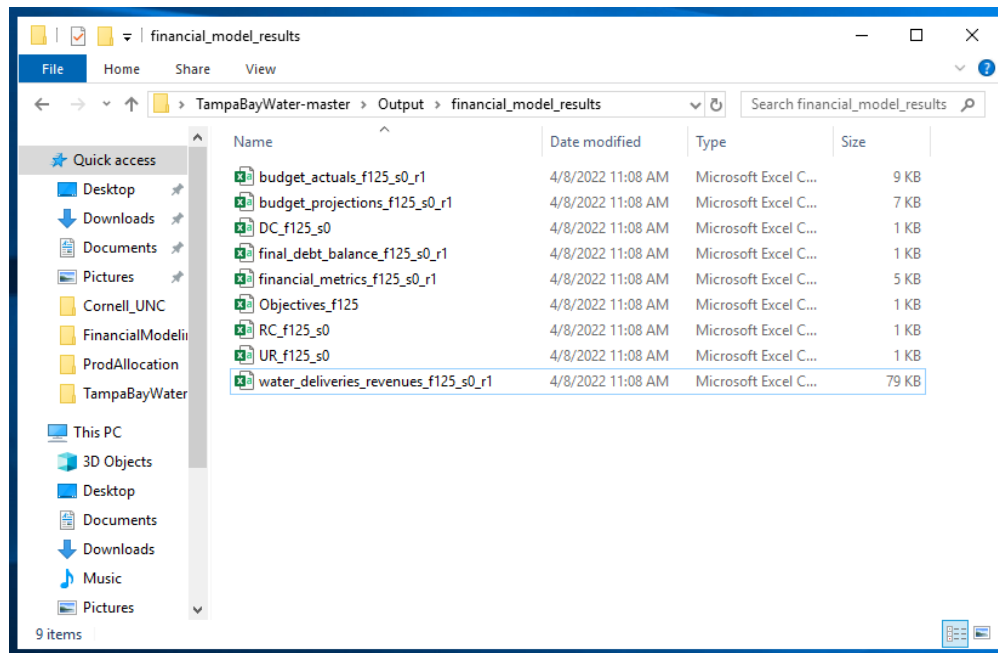
The financial model output can be found in 'TampaBayWater-GUI/Output/financial\_model\_results/'

## Tampa Bay Water Authority Financial Model GUI QuickStart Guide

Author: Lillian B. Lau (lbl59@cornell.edu)



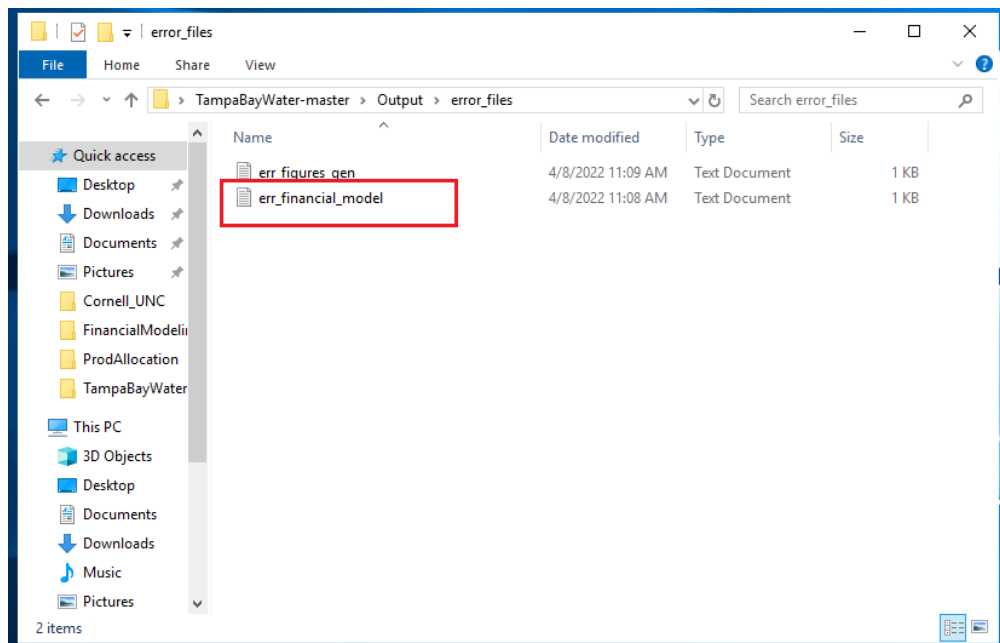
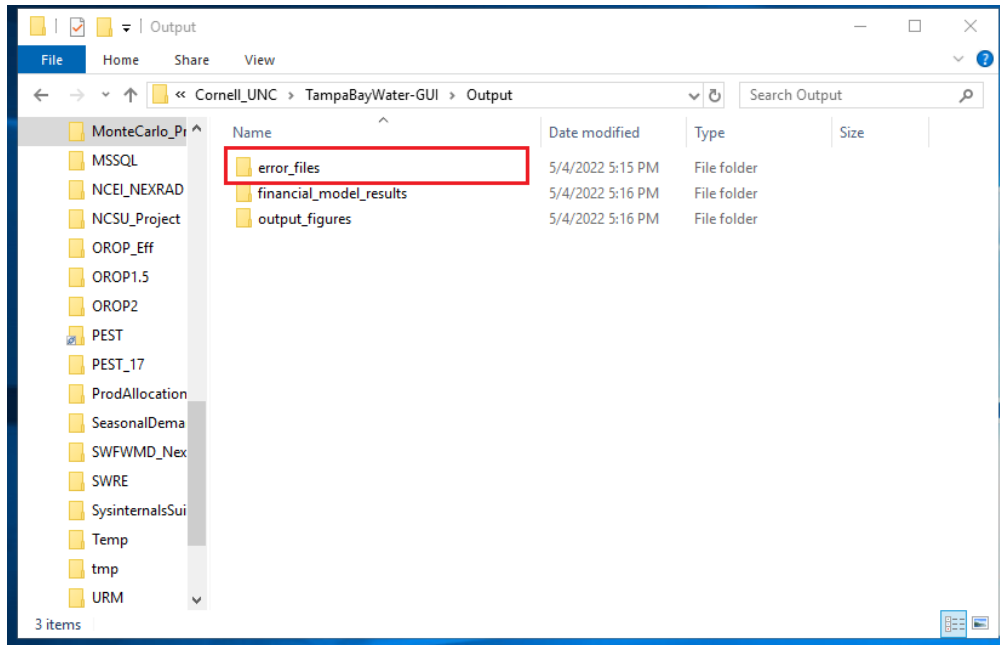
The following files should appear in the 'financial\_model\_results' folder:



Any potential errors that occurred during the model run will be listed in 'TampaBayWater-GUI/Output/error\_files/' folder within the 'err\_financial\_model.txt' file:

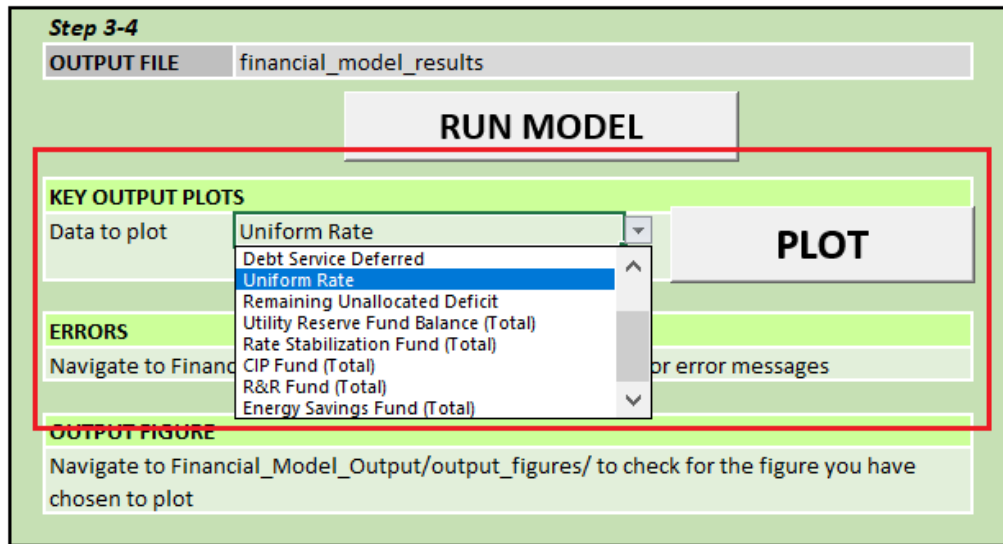
## Tampa Bay Water Authority Financial Model GUI QuickStart Guide

Author: Lillian B. Lau (lbl59@cornell.edu)



If there are no errors, only 'End error file' should be printed within 'err\_financial\_model.txt'.

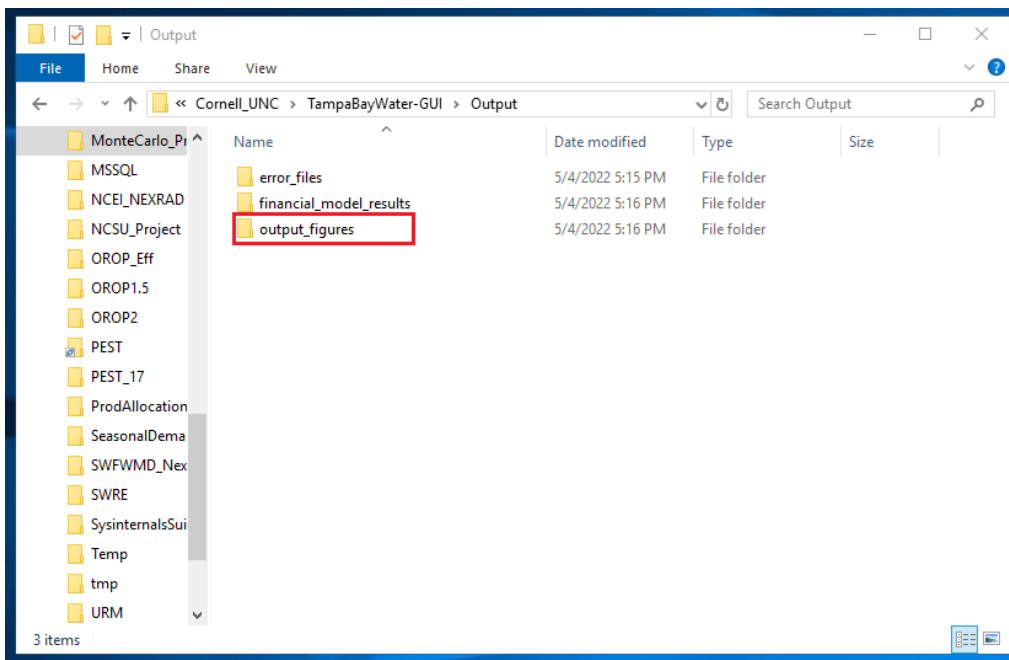
- b) Select the figure you would like to plot in the cell next to 'Data to plot'  
Descriptions for each of these figures can be found in the user manual.



Save your choice of figure by hitting 'Ctrl+S'

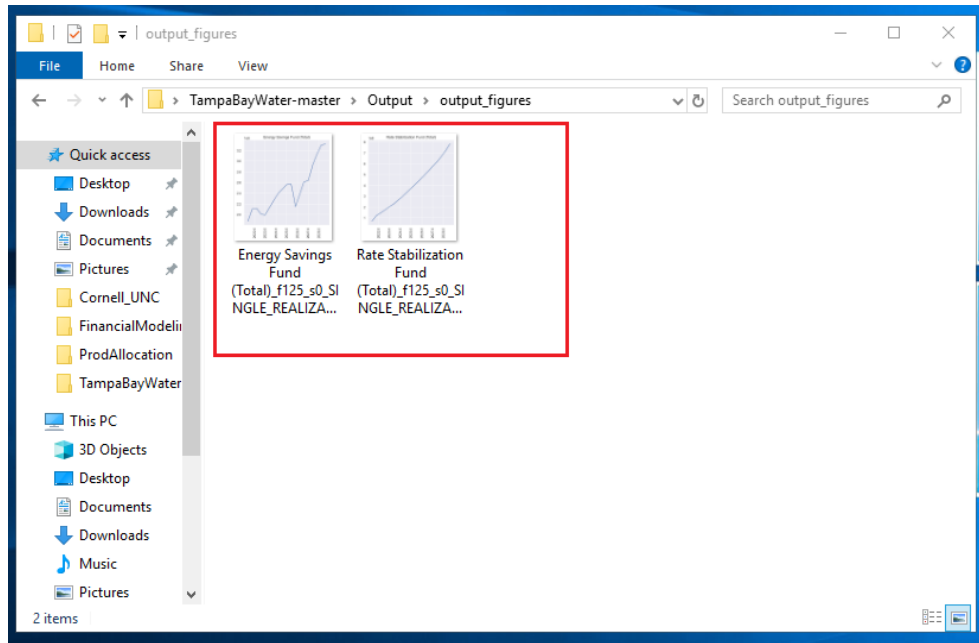
Click on 'PLOT'.

The desired figure should appear in a new pop-up window *and* be saved in 'TampaBayWater-GUI/Output/output\_figures/'



## Tampa Bay Water Authority Financial Model GUI QuickStart Guide

Author: Lillian B. Lau (lb159@cornell.edu)



Similar to the financial model output error file, any potential errors will be listed in 'TampaBayWater-GUI/Output/error\_files/' folder within the 'err\_figures\_gen.txt' file:

