

TREDIS 6 User Manual

Guidance for project setup, data entry, and results in TREDIS 6.

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TREDIS® 6 User's Manual



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Introduction to TREDIS

Objective of This Document

This TREDIS User Manual describes how to use TREDIS 6 and some best practices for using it as a decision-support tool. Additional practical support for using TREDIS is provided through context sensitive help screens. Other support documents are available on our website for a few special topics and to provide background on the theoretical development and data sources associated with TREDIS.

Note that TREDIS 6.0 is supported for use with the latest versions of Microsoft Edge, Chrome, and Firefox. If you are using any other means to access the platform, some features and functions may not work correctly.

Overview of the Purpose and Use of TREDIS

TREDIS is a decision-support tool that compares two "alternatives," that is, two possible futures, and shows the difference in economic impact and social benefits between those two alternatives. In most cases, the comparison will be between two mutually exclusive options, such as "build a new facility" or "don't build the new facility." In addition to a benefit-cost analysis (BCA) and economic impact analysis (EIA), TREDIS provides other reports that validate the results and provide additional context, as well as functionality that supports grant applications.

There are three major parts to setting up a TREDIS analysis. First, the dimensions of the analysis are defined, and the user selects the two alternatives, the time periods considered, the geographic units used, and the modes modeled. Second, the user provides data on travel behavior associated with each alternative (and, if desired, other data to support a market access or contingent development analysis). This is often done with the support of a travel demand model or sketch tool, but those are not strictly necessary. Third, the user needs to confirm the default factors that TREDIS provides for analysis – among them, operating costs, freight volumes, and other travel-related rates and levels – or overwrite the defaults with their own values.

Following the analysis run, TREDIS provides extensive reports that show BCA and EIA results in great detail, as well as supplemental reports providing greater support for further analysis. Reports in both BCA and EIA demonstrate the difference in expected outcomes across several years – each estimated individually – between the two alternatives defined.

Logging into TREDIS

Using your web browser, access TREDIS at login.tredis.net. Provide your user name and password in the appropriate spaces on the Login Page, as illustrated in the following figure.

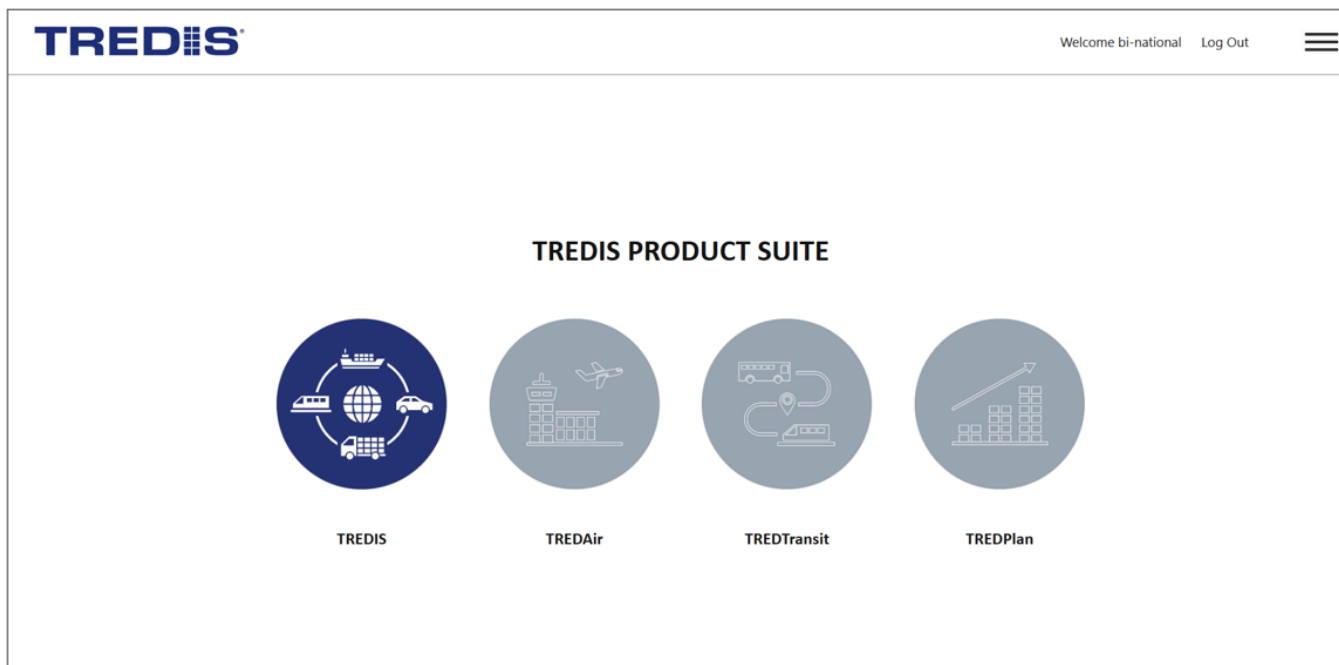
Note that the first time you login to the TREDIS software, you will be prompted to accept the terms of use and to change your password.



The Login Page

Note that the first time you login to the TREDIS software, you will be prompted to accept the terms of use and to change your password.

Once you are logged in, the products for which you have subscribed will be shown in color, while those that are not subscribed will be in black and white monochrome.



The Product Page

From here, click on the TREDIS icon to open TREDIS. You'll land on the *Project* page to start with.

Navigating TREDIS

Every TREDIS project follows the steps as shown in the navigation bar.



The Navigation Bar

Click the name of a page in the Navigation Bar to navigate to that page. Once a project is created, you will need to finish work on each step in order, left-to-right. Once all data has been initially entered, you can freely move between pages to view and edit data.

- **Project.** Choose a project, start a new one, set project-level preferences, or manage projects.
- **Timing.** Set the construction and operations periods for the project and distinguish separate segments of travelers.
- **Regions.** Define regions using a map to create the economic model.
- **Modes.** Choose modes and purposes.
- **Costs.** Enter capital, maintenance and other building costs by facility.
- **Travel.** Input primary travel characteristics (trips, VMT, and VHT) and adjust rates and flows as needed.
- **Access.** Provide market access changes (if desired for your analysis) or add ad-hoc economic changes expected.
- **Results.** On first view, select analysis parameters and start run. Once run, see all reports and model outputs.

Note: Do not use the back button on your web browser as this may prevent proper data loading. Instead, use the tabs in the Navigation Bar to move between pages in TREDIS.

Getting Help and the Navigation Menu

The three-bar icon (or "hamburger" icon) that is always visible in the upper-right of a TREDIS window is called the Navigation Menu. The following options are available:

- **User Documentation.** Technical and user documentation site that includes a link to this document.
- **Preferences.** Opens the Preferences Window.
- **Help.** Opens a section of the User Manual relevant to the screen you are currently on.
- **TREDIS User Manual.** Opens a new browser window with the full User Manual.
- **Sample Import Spreadsheet.** Downloads the current version of the Import Spreadsheet.
- **Product Menu.** Directs you to the Product Menu screen, with tiles highlighted depending on your user licenses.
- **Log Out.** Logs out and returns you to the login page.

Preferences Window

The preferences window sets user preferences that apply to the *Travel* page and the Results reports. To change preferences, choose selections and click *Save*.

The screenshot shows the 'Preferences' window with a title bar and a subtitle 'Note that Preferences apply to all your projects'. The window is divided into several sections:

- Travel characteristics: Input Preference**: Radio buttons for 'Travel Speed' and 'Travel Time' (selected).
- Travel characteristics: Crash Entry Method**: Radio buttons for 'Crash-Involved Vehicles' (selected) and 'Crashes'.
- Travel characteristics: Reliability Cost Estimation Method**: Radio buttons for 'Both' (selected), 'Fraction Congested', and a dropdown menu for 'Buffer Hours per Trip' (showing 'Buffer Hours per Trip', 'Buffer Time Index', and 'Total Buffer Hours').
- Pollutant Emission Damage Factors**: Radio buttons for 'Local Defaults' (selected) and 'National Defaults'.
- Results Pages Defaults**:
 - 'Source of Impact' dropdown set to 'Total Impact'.
 - 'Industry Aggregation' dropdown set to 'Major Industry Class - 14 Sectors'.
 - 'Discount Rates' input fields with '3.1' and '7'.

A 'Save Preferences' button is located at the bottom right.

Preferences Window

Travel Characteristics: Input Preference

- **Travel Speed** means that on the *Travel* page you may enter speeds instead of entering both travel time and travel distance.
- **Travel Time** means that you must enter travel time and travel distance.

Travel Characteristics: Reliability Cost Estimation Method

This selector includes both a radio button and a dropdown menu. The radio buttons select whether you will provide only fraction congested, only buffer time, or **Both** on the *Travel* page, under the *Congestion* tab. The dropdown selects what format you will enter for buffer time if you are going to enter it. (If you select **Fraction Congested**, the dropdown has no effect.)

- **Fraction Congested** means that on the *Travel* page, under the *Congestion* tab, you only enter the fraction congested for modes where congestion is relevant.
- **Buffer Time** means that on the *Travel* page, under *Congestion* tab, you may only enter the buffer time associated with each trip (in fractions of an hour). Choose this by clicking the radio button next to the *Reliability Metric Preference* dropdown. On the dropdown, choose the way that buffer time is entered.
- **Both** means that on the *Travel* page, you enter both fraction congested and buffer time using the metric selected by the *Reliability Metric Preference* dropdown.

Results Page Defaults

- **Impact Type** dropdown selection defines the default *Impact Type* filter for *Economic Impact* reports. This is a default but can be changed on individual reports.
- **Industry Aggregation** dropdown selection defines the default level of aggregation of industries for *Tracing/Validation* and *Economic Impact* reports. This is a default but can be changed on individual reports.
- **Discount Rates** selections define the two discount rates that are immediately available for *Benefit-Cost* reports. If these are changed and saved here, the *Benefit-Cost* reports will reload with the new discount rates available.

Travel Characteristics: Crash Entry Method

- **Crash-Involved Vehicles** means that on the *Travel* page, you may only enter rates and counts related to Crash-Involved Vehicles, not Crashes.
- **Crashes** means that on the *Travel* page, you may only enter rates and counts related to Crashes, not Crash-Involved Vehicles.

Pollutant Emissions Damage Factors

- **Local Defaults.** means that new projects will use region-specific Local Defaults for the cost of emissions for each year.
- **National Defaults.** means that new projects will use the National Defaults for the cost of emissions for each year. Any other values in the *Cost of Emissions by Year* window will be red to reflect that they don't match Local Defaults. Any other values in the *Cost of Emissions by Year* window that don't match your selection here will be rendered in red to reflect that they don't match the defaults.

Project Management

The *Project* page allows you to view the details of a Project in TREDIS or manage existing Projects.

When you enter TREDIS, you'll land on this page, and the last Project you worked on will be the Current Project.

Navigating to a Project

The top three fields of the *Project* page show the relevant Contract, Group, and Project name for the current Project selected, but can also be used to navigate to any project you have permissions to view or edit.

Contract: TREDIS 6 - 2022

Group: Test Runs 2025 Q1

Project: A Very Typical Project

Travel Analysis Type: Facility Based

Alternatives:

Base

Project

Project Notes:

This is where my project notes live.

Created On: 4/9/2025 at 4:36 PM Eastern Time

Analysis Completed: NA

Sort Groups by: Name

Sort Projects by: Project ID

Create New Project

Properties

Copy

Delete

Group Options

Import Projects

Compare Projects

Multi-criteria Compare

The Project Page

- **Contract.** The highest level of Project organization is by Subscription Contract. Contracts are used to associate projects with the data year and geographies of the economic data available.
- **Group.** Projects are next organized by Groups. To find an existing project, first select the desired Group from the dropdown menu. You can change the sorting order using the *Sort Groups by* control on the right.
- **Project.** Once you have selected the appropriate Group, you can then find a Project in the pull-down menu. You can change the sorting order using the *Sort Projects by* control on the right. Below the Project Name field, information and controls for the Current Project are available.

Details of the Current Project

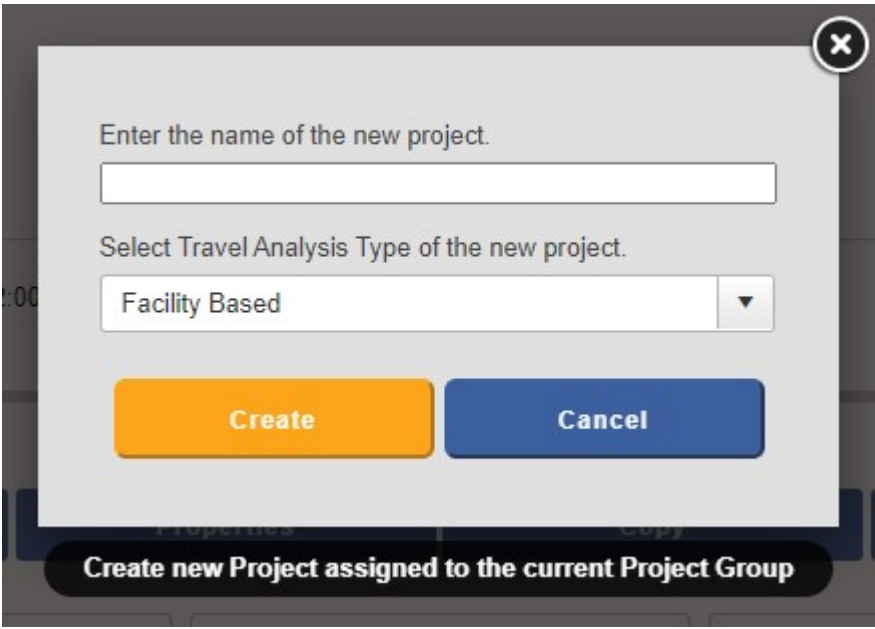
After the 3 dropdowns used to navigate to specific projects, there are fields showing the attributes of the current project selected.

- **Travel Analysis Type.** Either "Facility Based" or "O-D Based". The Travel Analysis Type is defined when creating the project and cannot be changed after, so it is only an informational field here.

- **Alternatives.** TREDIS automatically provides a Base alternative and a Project alternative when you create a project. You may change the name by clicking the rename link. Enter the desired name and then click the update link or cancel to keep the current name.
- **Project Notes.** Descriptive information about the current project here. To add or edit text in this field, click on the *Properties* button.
- **Created On.** Date and time the project was created by the system.
- **Analysis Complete.** If the results from an Analysis are already run, then this field will show the date the analysis was last run successfully. If the analysis was never run or the last run was not successful, this field will show "NA", indicating the results are not available without running the analysis. This status is helpful when submitting a project for a grant application, so you know when the analysis was run and if it was last run prior to the submittal due date.

Creating a New Project

The **Create New Project** button opens a popup window that lets you enter the name of your new project and select the Travel Analysis Type ("Facility Based" or "O-D Based"). The newly created Project will be assigned to the Current Group.



Creating a New Project

Facility Based or O-D Based

Facility Based projects will have Travel data that is entered for each region, summing up all facilities' travel in that Region, and using fractions to represent the share internal, incoming, outgoing, or going through the Region. This may be appropriate if you do not have information on intra-regional flows or are only modeling a single region. O-D Based projects use the concept of origin and destinations to specify the flow of travel between regions including a standard External region. This travel type eliminates the fraction of trips that are internal, incoming, outgoing, or through.

Choosing Base vs. Project

When choosing which of your alternatives should be entered as the Base alternative and which should be entered as the Project alternative, there are a few considerations.

Best practice is typically that Base is the alternative you assume to be worse performing. So in a case where an infrastructure investment is being considered, the alternative where no investment is made would be Base and the alternative where an investment is made would be Project (on the assumption the investment is likely to improve conditions). If you are considering an alternative where a possible facility failure comes to pass, that should be the Base alternative, since the performance and economy is likely to be worse than if nothing happens (which should be represented by the Project alternative).

There are some further considerations:

- Negative economic impact outcomes might be affected differently by drags than by productivity improvements, because increased transportation costs result in negative economic impacts. These impacts are not symmetrical in magnitude to the economic impacts estimated if transportation costs decreased by the same amount. This reflects the fact that business react differently to increased costs and may seek alternative measures to manage higher transportation costs with decreasing output and employment. More cost-efficient systems on the other hand are more free to expand in optimal manners. Because of this imbalance, alternatives with higher costs should only be used as the Project case when these increased costs are the objective of the policy or investment strategy being analyzed and above the level of baseline forecasts. For all studies examining how transportation actions could support a stronger economy, the project case is expected to show cost savings.
- Induced travel is not currently supported for the Base alternative, only the Project alternative.

You may want to enter the Project alternative when worse than the base alternative when any of the following are true:

- Baseline forecasts ignore a cost that should be taken into account
- Increased costs are the objective of the policy or investment strategy being analyzed and above the level of baseline forecasts

The Properties Button

To change the properties of the current Project selected, use the *Properties* button. This popup window lets you add an optional Project ID, change the name of your Project, reassign its Group, or to add Project Notes. Use the *Sharing Mode* radio buttons to toggle "Private", where only the project owner may see the project or "Shared", where anyone with a user login within your account may see the project (though only in a read-only capacity). Shared projects may be copied.

If you want to share this project with a US DOT Grant Reviewer as part of a grant application, check the *US DOT Review Enabled* checkbox. This will allow a grant reviewer to see a read only copy of your project. They may also make a copy which will allow the review to make adjustments to the mode factors and travel inputs as part of their review. Any copies made by the reviewer will be visible to you as a shared project in the same contract and project group as the original submitted project. The grant reviewer's name will appear with the new copied project.

Note: To remove permission for a grant reviewer to see your project, uncheck the box and press the Save button.

The Properties Window

Managing Project Records

Use the *Copy* button to make a copy of the current Project. In the window that opens, enter the name for the copy.

Use the *Delete* button to delete the current Project. You will be given an opportunity to confirm the deletion. Only the project owner may delete a project.

Warning: Once a project is deleted, it cannot be recovered.

Multi-Project Function Buttons

For more advanced users, TREDIS provides you with the ability to manage the Projects in your Groups and to perform a bulk import of projects or a bulk export of results. Each of the buttons opens a new window or interface.

[Group Options](#) Organize, rename, delete, create backups and export results for multiple projects.

[Import Projects](#) Upload multiple projects at once using a spreadsheet. The TREDIS Project Import Template spreadsheet is available by clicking on the on the menu icon at the top right of the screen and select the Sample Import Spreadsheet or click on the *Import Projects* button and select the Import Project Template Spreadsheet link.

[Compare Projects](#) In a separate tool, compare the results from multiple Project records in the current Contract and current Group.

[Multi-criteria Compare](#) Prioritize projects with a specialized tool that can weight factors such as VMT savings, economic impacts, and equity considerations.

Group Options

In TREDIS, each analysis of a Base-Project alternative pair is called a Project, and projects are organized into Groups. The *Group Options* window allows you to manage the organization of their projects. TREDIS also allows performing multi-project tasks, such as exporting results, changing sharing levels, and deleting multiple projects.

Modify Group

Create New Group Select Group to Modify Rename Delete

Range Selection

Start Project # End Project # Select

Modify Selected Projects

Filter by Group: Default Group Assign to Different Group Assign

Delete Selected Projects Change Sharing Mode Change

Multi-Run & Summary Results

Back-up Project Inputs

Export Detailed Results

Search:

		Project Group	Analysis	Project Name	Owner	Mode	Creation Date	Last Modified
1.	☒	Default Group		Help Manual Illustration - 1 Future Year	bi_alpha_tester	Private	4/7/2026 2:31 PM	4/7/2026 2:32 PM
2.	☒	Default Group		Help Manual Illustration - 1 Year	bi_alpha_tester	Private	4/7/2026 2:22 PM	5/7/2026 12:13 PM
3.	☒	Default Group	Complete	Help Manual Illustration - Access	bi_alpha_tester	Private	3/30/2026 12:33 PM	4/7/2026 2:11 PM
4.	☒	Default Group		Help Manual Illustration - Balancing	bi_alpha_tester	Private	4/28/2026 3:11 PM	4/29/2026 4:20 PM
5.	☐	Default Group		Help Manual Illustration - Flow	bi_alpha_tester	Private	4/28/2026 2:34 PM	4/28/2026 2:59 PM
6.	☐	Default Group		Help Manual Illustration - Multi-Region	bi_alpha_tester	Private	4/30/2026 3:38 PM	4/30/2026 3:44 PM
7.	☐	Default Group		Help Manual Illustration - Multi-Year	bi_alpha_tester	Private	4/30/2026 2:59 PM	4/30/2026 3:05 PM
8.	☐	Default Group		Help Manual Illustration - OD Based	bi_alpha_tester	Private	4/30/2026 3:44 PM	5/6/2026 4:05 PM

Showing 1 to 8 of 8 entries (filtered from 134 total entries)

Close ?

Group Options Window

Modify Group

The controls in the *Modify Group* section let you change the Groups (not the projects themselves) for the current contract you are working in.

Use the dropdown menu to select a Group to modify.

- **Create New Group.** Create a new Group. This will open a popup window that lets you enter the name of your new Group.
- **Rename.** Rename the current Group selected. Then press the *Rename* button, which will open a window to enter the new name.

- **Delete.** To delete a group, select the Group to delete from the dropdown menu, then press the *Delete* button. A window will open to confirm that you want to delete permanently.

Selecting Projects

In the *Group Options* window, before you can perform any bulk operations on projects listed in the *Modify Selected Group* section or any of the buttons to the right, you must select any number of projects in the current Group at the same time to perform those actions on.

	Project Group	Analysis	Project Name	Owner	Mode	Creation Date	Last Modified
1. ☒	Default Group		Help Manual Illustration - 1 Future Year	bi_alpha_tester	Private	4/7/2026 2:31 PM	4/7/2026 2:32 PM
2. ☒	Default Group		Help Manual Illustration - 1 Year	bi_alpha_tester	Private	4/7/2026 2:22 PM	5/7/2026 12:13 PM
3. ☒	Default Group	Complete	Help Manual Illustration - Access	bi_alpha_tester	Private	3/30/2026 12:33 PM	4/7/2026 2:11 PM
4. ☒	Default Group		Help Manual Illustration - Balancing	bi_alpha_tester	Private	4/28/2026 3:11 PM	4/29/2026 4:20 PM
5. ☐	Default Group		Help Manual Illustration - Flow	bi_alpha_tester	Private	4/28/2026 2:34 PM	4/28/2026 2:59 PM
6. ☐	Default Group		Help Manual Illustration - Multi-Region	bi_alpha_tester	Private	4/30/2026 3:38 PM	4/30/2026 3:44 PM
7. ☐	Default Group		Help Manual Illustration - Multi-Year	bi_alpha_tester	Private	4/30/2026 2:59 PM	4/30/2026 3:05 PM
8. ☐	Default Group		Help Manual Illustration - OD Based	bi_alpha_tester	Private	4/30/2026 3:44 PM	5/6/2026 4:05 PM

Showing 4 of 8 entries (filtered from 134 total entries)

Group Options Window with Projects Selected

Before you select projects, make sure the current Group you want to operate on is active. This can be done by choosing a Group from the *Modify Selected Projects* section, with the *Filter by Group* control. Doing this will change the Projects listed in the pane at the bottom. Alternatively, you can select all projects associated with the current contract by selecting All Groups.

The available projects to select or deselect are listed at the bottom of the window along with their details. You can select them using any combination of these methods.

- **Manual selection.** You can always click the checkbox to the left of each project name to select or deselect it.

- **Toggle all.** Check the box at the top of the pane to select (or deselect) all of the projects listed.
- **Range Selection.** In the Range Selection section at the top right of the window, enter the first and last row numbers for the projects you wish to select, and the system will automatically select these projects.

Modify Selected Projects

You can perform operations on all of them using the options in the *Modify Selected Projects* section of this window.

Use the *Filter by Group* dropdown to select the desired Group. You also have the option to select all groups by selecting *All Groups* from this menu. You will notice that the list of projects below will change based on the filter settings.

After selecting projects to operate on using the options described in the section above, you can perform the following actions on all of them:

- **Assign to Different Group.** Use the dropdown menu *Assign to a Different Group* to select a Group to reassign the select projects, and click the Assign button. If you have filtered your projects by a specific group, they will disappear from the current view to reflect the change.
- **Change Sharing Mode.** Use the dropdown menu *Change Sharing Mode* to change projects from Private to Shared (or Shared to Private), and click the *Change* button.
- **Delete Selected Projects.** Delete any projects currently selected. You will be asked to confirm before this is executed. This process may take some time, and a progress message will appear to the left of a button labeled *Cancel Deletion*.

Bulk Operation Buttons

Other important operations that result in an exported Excel sheet can be accessed via the buttons to the right of the *Modify Selected Projects* section. Each of these buttons launches its own window to launch the operation.

Click on the names of the buttons below for detailed instructions on the operation.

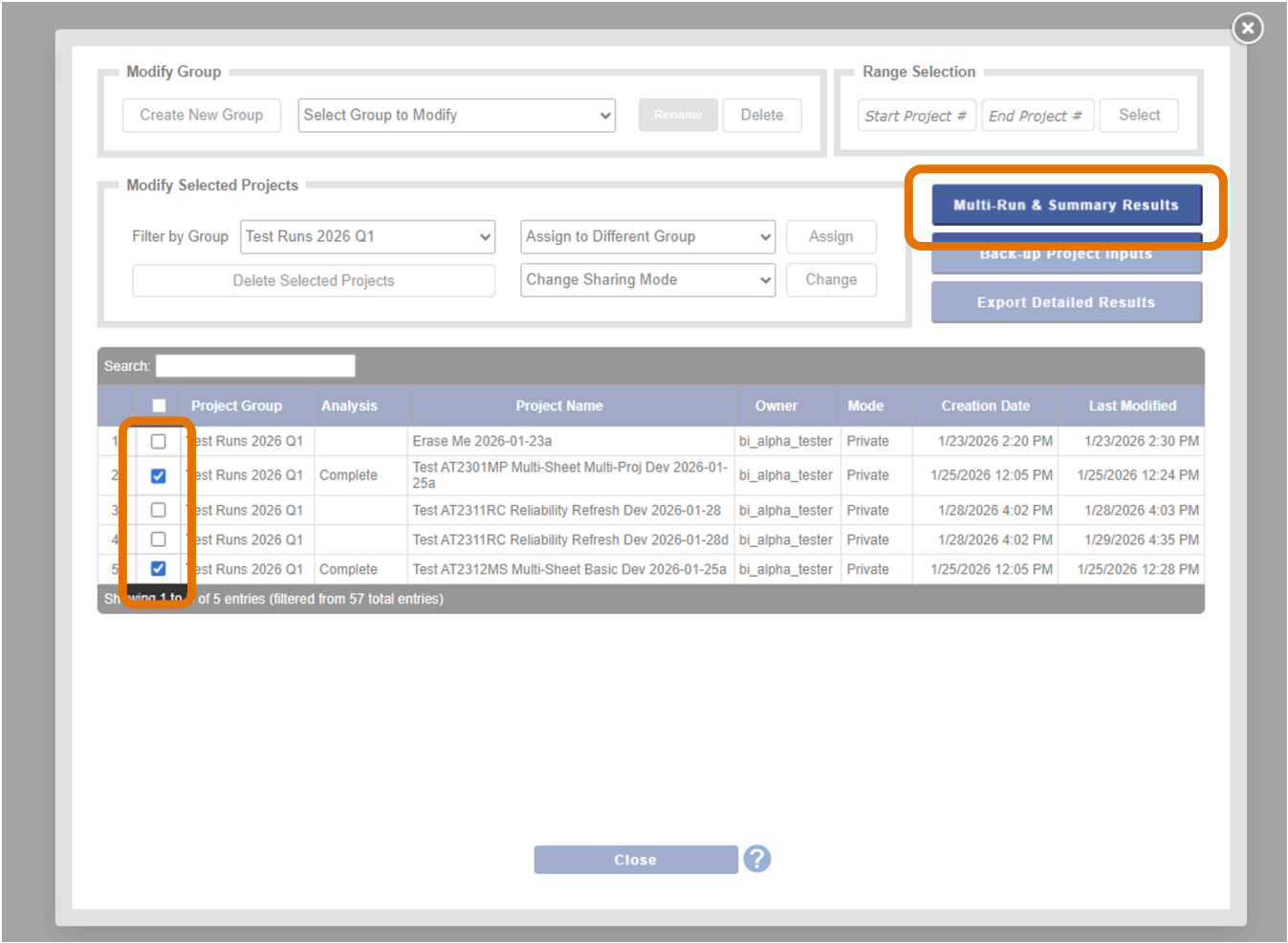
- [Multi-Run & Summary Results](#). Run the selected projects and export a summary Excel spreadsheet to be sent to e-mail.
- [Back-up Project Inputs](#). Create a back-up Excel spreadsheet of selected projects for re-import later.
- [Export Detailed Reports](#). Produce an Excel spreadsheet combining multiple Results reports for the selected projects.

Multi Run & Summary Results

Some workflows, such as prioritization processes, require comparison of a substantial number of projects at the same time, often those sharing the same Construction and Operations periods. These could be imported in a single import, and, similarly, may be run and reported on in a single exported Excel workbook in a few clicks by using the *Multi-Run & Summary Results* functionality.

Accessing Multi-Run & Summary Results

From the *Project* page, click on the *Group Options* button at the bottom to reach the *Group Options* window. Select projects to run and export, keeping in mind they need to share at least Operations periods to be run through the *Multi-Run & Summary Results* function. Click the *Multi-Run & Summary Results* button to access the function.



Multi-Run & Summary Results Button with Projects Selected

Using the Window

The window that appears is used to control the running settings that will be used on all the projects being run and reported on.

In the top section, several options mirror those available in the regular [Results Settings](#) page. These include the following:

- Charge Interpolation
- Depreciation Type
- Safety Economic Impact
- Interpolation Method
- B/C Perspective
- Discount Rates



The screenshot displays a web-based form titled "Multi-Run & Summary Results Window". The form is organized into two columns of settings. On the left column, the "Results Year" is set to 2047, "Charge Interpolation" is set to "None", "Depreciation Type" is set to "One-Time Project", "Safety Economic Impact" has "Include" and "Exclude" radio buttons with "Exclude" selected, and the "Export File Name" is "Export_2_2_2026". On the right column, the "Interpolation Method" is "Compound Annual Growth", "B/C Perspective" has "Study Region" and "National Perspective" radio buttons with "National Perspective" selected, the "Discount Rate" is 3.1%, and the "Short-term Year" is set to "All Years". At the bottom, there is a "Confirmation Email" field with the address "brandon.irvine@ebp-us.com". Below the form fields is a checkbox labeled "Rebuild Model" which is currently unchecked. At the very bottom are two blue buttons: "Run Analysis" and "Back to Project List".

Multi-Run & Summary Results Window

Additionally, there are controls that are options that are specific to Multi-Run:

- **Results Year.** The year for which Long-Term Impacts are reported in the resulting output.
- **Short-term Year.** The years and type of reporting for which Short-Term Impacts are reported.
- **Export File Name.** Name of the file (with .xlsx appended) that will be produced.
- **Confirmation Email.** E-mail where the file will be sent. Not required.

- **Rebuild Model.** Rebuild the economic model. This is not commonly used and unlikely to be necessary unless you have been advised by TREDIS to use it.

When you have made your selections, click *Run Analysis* to launch the process and a status bar. For multiple projects, this process may take time.

When completed, a button for a direct download will appear if you do not wish to access via e-mail. Click *Back to Project List* to return to TREDIS.

Overview of Report

The resulting Excel file has three sheets.

- **Read Me** orients the user to the purpose of the workbook and includes version information.
- **Summary Results Columns** is the primary documentation for the report. Consult this for the most detailed explanation of results reported.
- **Summary Results** is the primary report.

	A	B	C	D	E	F	AS	AT	AU	AV
1										
2		Results Year		2047						
3		Charge Interpolation		None						
4		Depreciation Type		One-Time Project						
5		Safety Economic Impact		Exclude						
6										
7	Project Information						Value Added Impact Breakdown			
	Group Name	Project ID	Project Name	Project Owner	Constant Dollar Year	Study Region	Net Present Value: Full User Benefit (A+B+C)	Net Present Value: Total Societal Benefit (A+B+C+D+E)	Long-term Total: Direct	Long-term Total: Indirect & Induced
8										
9									2047	2047
10	Test Runs 2026 Q1		My Multi-Region Example	my_username	2023	Western Massachusetts	N/A	N/A	N/A	N/A
11	Test Runs 2026 Q1		My Multi-Region Example	my_username	2023	Eastern Massachusetts	N/A	N/A	N/A	N/A
12	Test Runs 2026 Q1		My Multi-Region Example	my_username	2023	TOTAL - All Regions	28	30	1.34	1.30
13	Test Runs 2026 Q1		My Single-Region Example	my_username	2023	Massachusetts Statewide	-26	-25	0.29	0.28

Example Exported Workbook

Create Project Backup

Enter a name for your Project Backup Spreadsheet and select the file type, .xlsx or .xls. Next provide your email address to be notified when the backup process is completed.

Press the *Create Backup File Now* button to start the process. When done, a download link will be provided and an email with a downlink if your email address was provided.

Create Project Backup

File Name:

File Type:

xlsx

Confirmation Email:

Create Backup File Now

Go Back to Project List

Close

?

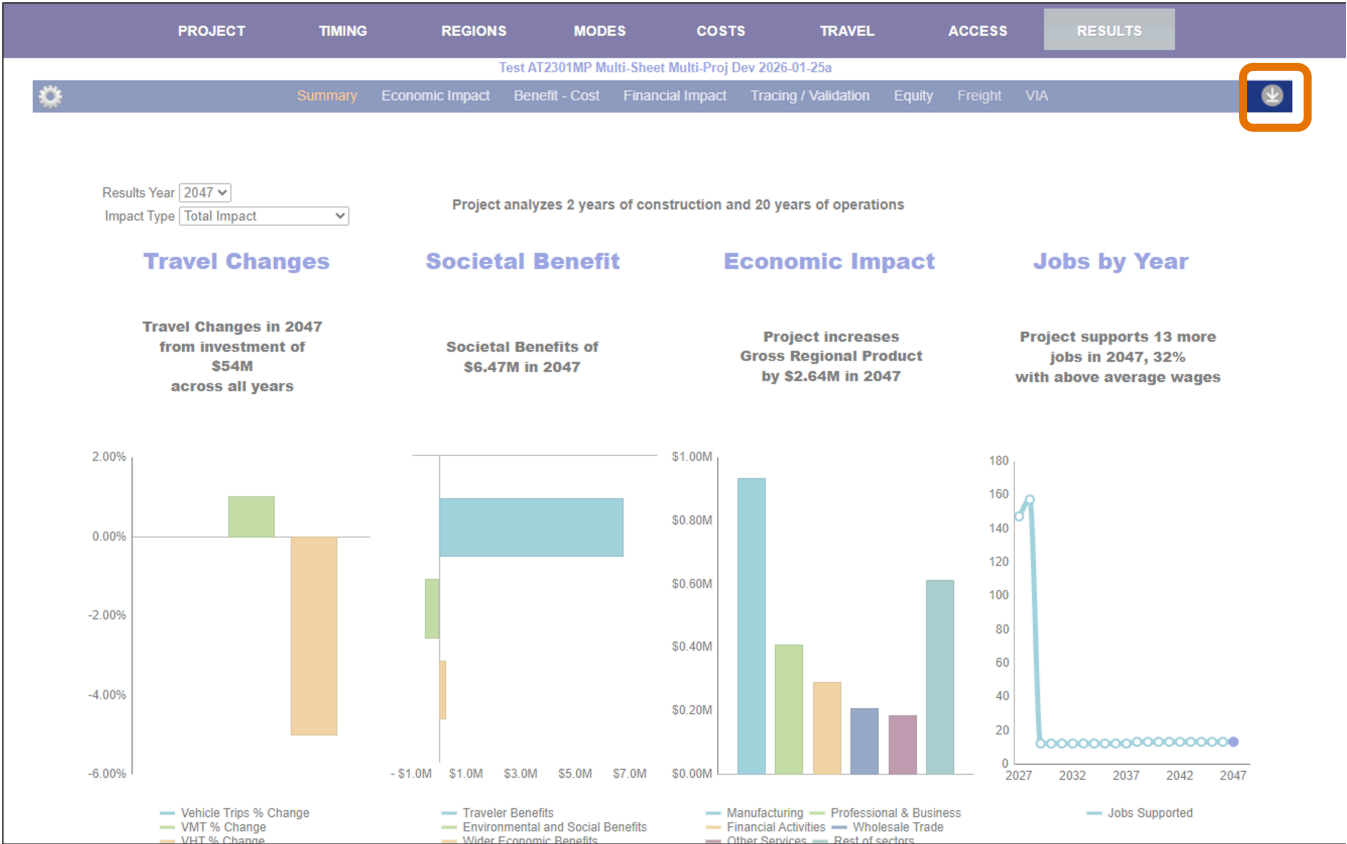
Project Backup

Export Detailed Reports

TREDIS supports the exporting of a single Excel workbook with multiple sheets of results tables for a single analysis or multiple analyses. Users can create a workbook template to reuse across their projects, selecting which of the many reports they want to include in their workbook, as well as setting the options that affect the contents of those reports. Using the template, then the user can download all the reports at once.

Exporting for One vs. Multiple Projects

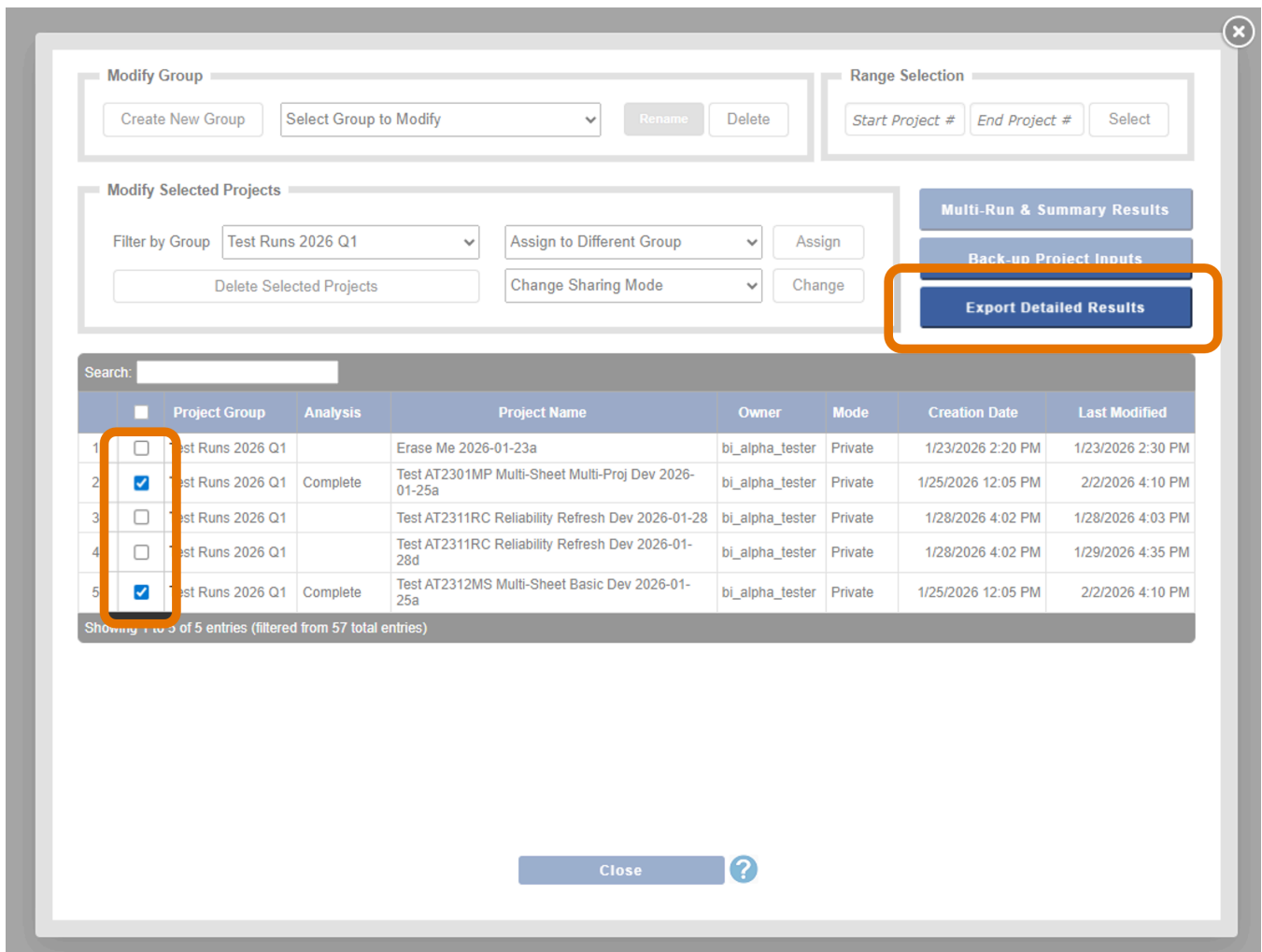
To export multiple reports for a single project, go to the *Results* page. The *Multi-Report* icon (a downward arrow) appears on the far right of the bar running along the width of the screen. This icon is available from any of the *Results* subpages.



The Multi-Run Icon

Clicking on this icon will open the *Multi-Report Interface* discussed below.

The same interface can be accessed for multiple projects so that you can export multiple reports for multiple projects. To access this functionality, start by clicking on the *Group Options* button on bottom of the *Project* page. The *Group Options* window will open.



Group Options Window with Projects Selected

From the *Group Options* window, select the projects to export reports for, and click the *Export Detailed Results* button to launch the *Multi-Report Interface* described below.

Running and Exporting Reports

Whether you are accessing it from the *Results* for a single project or from the *Group Options* window for multiple projects, the *Multi-Report Interface* will appear as below.

The screenshot displays the 'Multi-Report Interface' with a dark blue header containing tabs: PROJECT, TIMING, REGIONS, MODES, COSTS, TRAVEL, ACCESS, and RESULTS. Below the header, a sub-header reads 'Test AT2301MP Multi-Sheet Multi-Proj Dev 2026-01-25a'. A navigation bar includes links: Summary, Economic Impact, Benefit - Cost, Financial Impact, Tracing / Validation, Equity, Freight, and VIA. The main content area features a template selection dropdown set to 'Template Example for Release Note' and a 'Download File' button. Below these are settings for 'Economic Activity' (Compare Project vs. Base), 'Impact Type' (Total Impact), 'Industry Aggregation' (Standard Report format - 53 sectors), 'Occupational Aggregation' (2 digits), and 'Discount Rates' (3.1% and 7%). Action buttons include 'Save As New Template', 'Update Template', and 'Delete Template'. The interface is divided into sections for 'Economic Impact', 'Benefit - Cost', 'Tracing / Validation', and 'Equity', each with specific checkboxes selected (e.g., 'Total By Industry', 'Overview', 'Value of Benefits - By Year', 'Cost Savings by Type', 'Equity Context').

Multi-Report Interface

Reports are produced based on a template, so before TREDIS can produce a report, a template needs to be saved. For example, in the figure below, the reports for *Total by Industry*, *Benefit – Cost Overview*, *Value of Benefits by Year*, *Cost Savings by Type*, and *Equity Context* have been selected. In this example, the default settings (adjusted using dropdowns at the top) have been used.

The template has already been saved in figure above as *Template Example for Release Note*. Once you save a template, you will be able to use it whenever you access the *Multi-Report Interface*.

The name of the current template is provided in the pop-up that opens when you click *Save As New Template*. If you click *Update Template*, the settings for the selected template will be overwritten with your current selection.

You may need different batches of reports for different business processes, so TREDIS can save and reuse a template. Once a template is added, it can be accessed via the dropdown at the top of the interface, next to the *Download File* button.

Once you have saved a template, an Excel workbook based on this template can be prepared. Clicking *Download File* will start the file preparation process. When completed, the file will be downloaded to your device's Downloads folder or other default location.

Using the Export Workbook

The Excel workbook that you download will always include a *Settings* sheet, as seen below, that indicates what settings were applied to produce the results in the exported file.

	A	B	C	D	E
1					
2					
3		Economic Activity		Compare Project vs. Base	
4		Impact Type		Total Impact	
5		Industry Aggregation		Standard Report format - 53 sectors	
6		Occupational Aggregation		2 digits	
7		Discount Rates		3.1% 7%	
8					
9		* Some equity reports are not available for single region projects			
10		* All segments are combined for multi-segment projects			
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
<div><div>< ></div><div>Settings</div><div>Total By Industry</div><div>Benefit - Cost Overview</div><div>Value of Benefit Stream by Year</div><div>Cost Savings by Type</div><div>Equity - Context</div></div>					

Detailed Results Settings Tab

Each other worksheet represents a report. If you selected multiple projects to report on, separate projects are reported in the same sheet but are differentiated by the *Project Name* column, where the project name is given for the results. You can see the results for the first project selected in the *Group Options* interface. Scroll down further in a workbook to see results for the other projects selected, or add filters to the column headers to focus on specific projects or attributes.

	A	B	C	D	E	F	G	H	I
1	Economic Impact								
2	Total By Industry (2023 \$M)								
3	2 projects								
4	* Jobs not reported for rows summarizing over years.								
	Project Name	Region Name	Data Year	NAICS	Industry	Business Output	Value Added	Jobs	Labor Income
6	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	All Years	All NAICS	All Industries	\$49.75	\$26.20	NA	\$17.85
7	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	All NAICS	All Industries	\$15.65	\$8.97	75	\$6.33
8	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	111-115, 211-213	Crop Production	\$0.004	\$0.002	0	\$0.001
9	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	221	Animal Production	\$0.000	\$0.000	0	\$0.000
10	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	230	Forestry & Logging	\$0.000	\$0.000	0	\$0.000
11	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	311-339	Fishing, etc.	\$0.000	\$0.000	0	\$0.000
12	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	420	Support for Agric & Forestry	\$0.000	\$0.000	0	\$0.000
13	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	441-454	Oil and Gas Extraction	\$0.000	\$0.000	0	\$0.000
14	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	481-488	Mining, Quarrying, & Support	\$0.059	\$0.031	0	\$0.016
15	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	491-493	Utilities	\$0.182	\$0.083	0	\$0.030
16	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	511-519	Construction & Buildings	\$3.526	\$2.054	22	\$1.693
17	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	521-525, 531-533	Food Manufacturing	\$0.008	\$0.002	0	\$0.001
18	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	541,551,561-562	Beverage & Tobacco Product Manufacturing	\$0.008	\$0.002	0	\$0.001
19	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	611, 621-624	Textile Mills & Products Manufacturing	\$0.000	\$0.000	0	\$0.000
20	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	711-713, 721-722,811-814	Apparel Manufacturing	\$0.000	\$0.000	0	\$0.000
21	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	920	Leather Product Manufacturing	\$0.000	\$0.000	0	\$0.000
22	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	321	Wood Product Manufacturing	\$0.015	\$0.003	0	\$0.004
23	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	322	Paper Manufacturing	\$0.014	\$0.003	0	\$0.003
24	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	323	Printing	\$0.007	\$0.003	0	\$0.002
25	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	324	Petroleum and Coal Products Manufacturing	\$0.279	\$0.109	0	\$0.097
26	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	325	Chemical Manufacturing	\$0.009	\$0.004	0	\$0.001
27	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	326	Plastics & Rubber Products Manufacturing	\$0.021	\$0.006	0	\$0.004
28	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	327	Nonmetal Mineral Product Manufacturing	\$0.589	\$0.232	2	\$0.129
29	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	331	Primary Metal Manufacturing	\$0.442	\$0.029	0	\$0.016
30	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	332	Fabricated Metal Manufacturing	\$0.038	\$0.014	0	\$0.010
31	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	333	Machinery Manufacturing	\$0.004	\$0.002	0	\$0.001
32	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	334	Computer and Electronic Manufacturing	\$0.001	\$0.000	0	\$0.000
33	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	335	Electrical Equipment & Appliance Manufacturing	\$0.002	\$0.001	0	\$0.000
34	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	336	Transportation Equipment Manufacturing	\$0.000	\$0.000	0	\$0.000
35	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	337	Furniture Manufacturing	\$0.001	\$0.000	0	\$0.000
36	Test AT2301IMP Multi-Sheet Multi-Proj Dev 2026-01-25a	Western Massachusetts	2027	339	Miscellaneous Manufacturing	\$0.003	\$0.001	0	\$0.001

Detailed Results Export Report Tabs

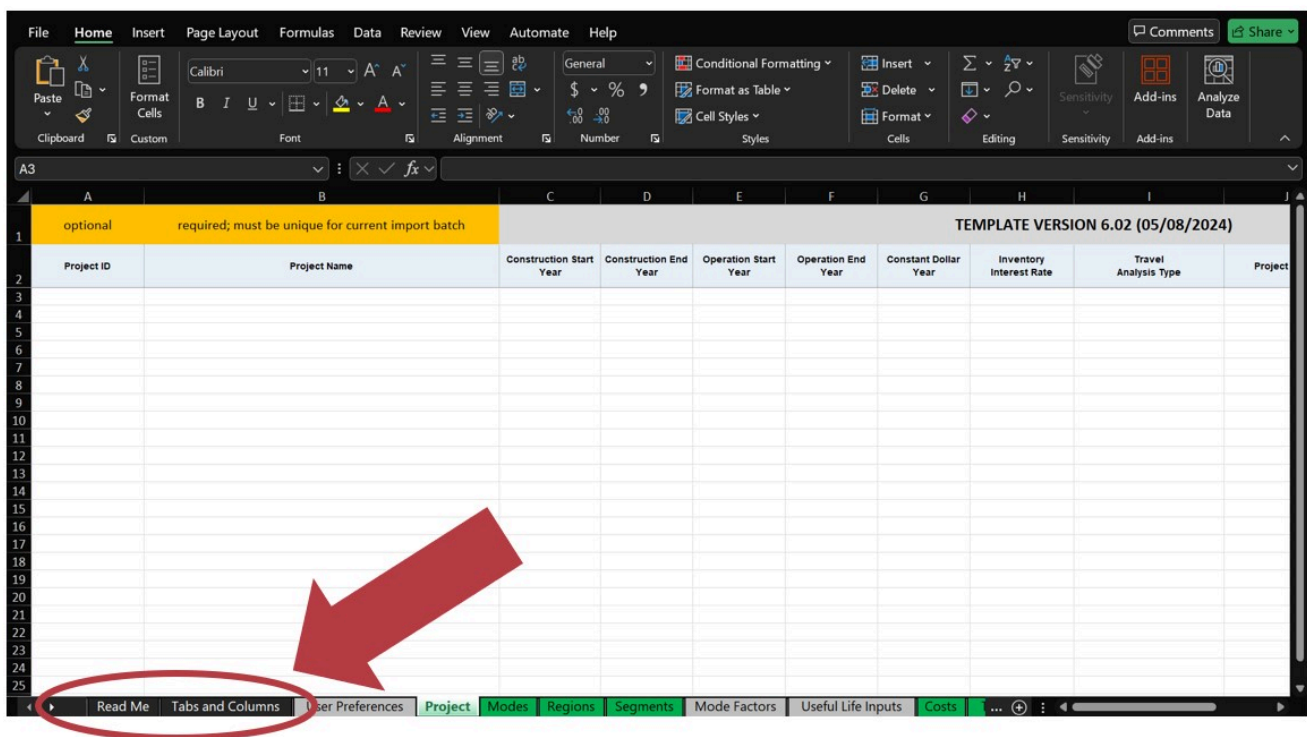
Project Management - Import Projects

The project import functionality in TREDIS is a powerful feature that can be used to recreate project backups and, for advanced users, to create projects in bulk. In either case, TREDIS projects are read in from an Excel file in the Import Spreadsheet format.

The Import Spreadsheet

The Import Spreadsheet in TREDIS is an Excel file with a defined structure. You can see a sample by clicking on the menu icon at the top right of the TREDIS screen and selecting Sample Import Spreadsheet.

The spreadsheet has its own documentation on the *Read Me* and *Tabs and Columns* tabs. (Black tabs are documentation, green tabs are necessary, and gray tabs are optional.)



The Import Spreadsheet File

Troubleshooting Import

If you've never imported a project before, we recommend that you back up a project first. Once the back-up is downloaded, open the Excel file and read the documentation (on the black tabs at the far left). You should also take a minute to browse the green and gray data tabs to see how data is organized and presented. This will help you avoid errors in import and understand the purpose of individual tabs. Common problem areas are discussed below.

Preferences

On the User Preferences tab, the Preference Settings values should match your current user Preferences. To change your current User Preferences, click on the on the Navigation Menu (at the top right of the TREDIS screen)

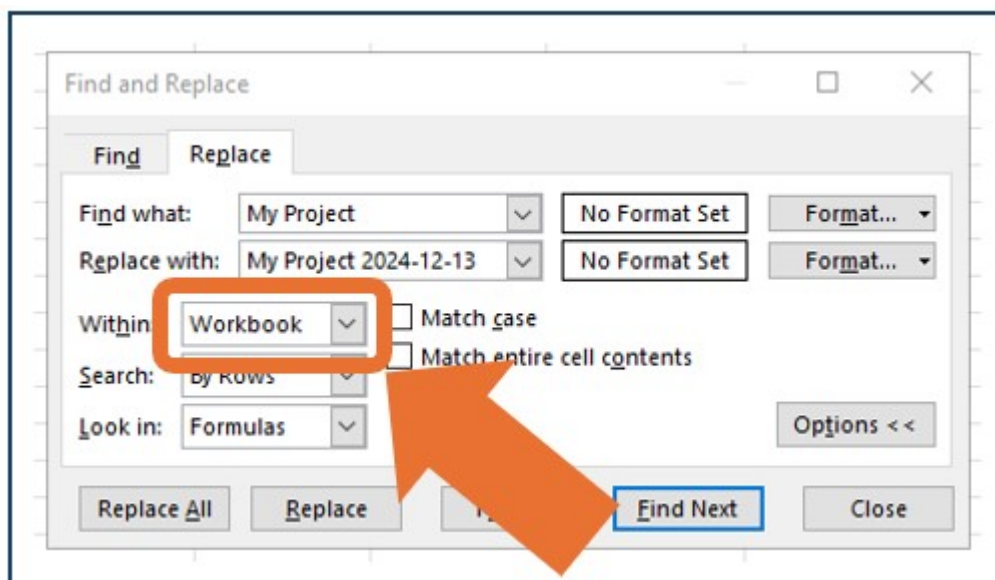
and select [Preferences](#).

Dollar Year

On the Project tab, the Constant Dollar Year should be the same for all projects and match the year of the Contract you are trying to import to.

Unique Project Names in a Group

The names of any projects being imported cannot be the same as any projects in the group being imported into. You can always add a suffix with the date if you are unsure if the projects you're importing will have a unique name. (For example, "My Project" could become "My Project 2024-12-13".) If you need to update project names in Excel, you will probably want to use the Find-Replace functionality, with the *Within: Workbook* option selected, as in the screenshot:



Selecting Projects to Import

Missing Data on Green Tabs

Make sure data is entered for all green tabs in the Import Spreadsheet (or for the OD version of the tab, if appropriate). An exception is the Costs tab. TREDIS cannot provide default Costs data, but the tab can be left blank if you do not intend to analyze cost data. (This might limit your analysis. For example, you won't be able to calculate a benefit-cost ratio without costs input.)

Import Steps

This section steps through the screens and operations to import projects in the TREDIS application.

From the Project page, start the process by clicking the *Import Projects* button at the bottom of the screen.

TREDIS 6

PROJECTTIMINGREGIONSMODESCOSTSTRAVELACCESSRESULTS

PROJECT

Contract:TREDIS 6 - 2020 Demo

Group:Demo Runs 2023 Spring

Project:Demo 002 Hwy Alt 17 Mar 2023

Sort Groups by:Name

Sort Projects by:Project ID

Travel Analysis Type:Facility Based

Alternatives:

Base

Project

Overview:

Demo of single region highway widening, where highway widening leads to overall slight increase in VMT, decrease in VMT, and decrease in congestion.

Project Notes:

Created On:3/17/2023 at 10:39 AM Eastern Time

Analysis Completed:3/17/2023 at 10:26 AM Eastern Time

Create New Project

Properties

Copy

Delete

Group Options

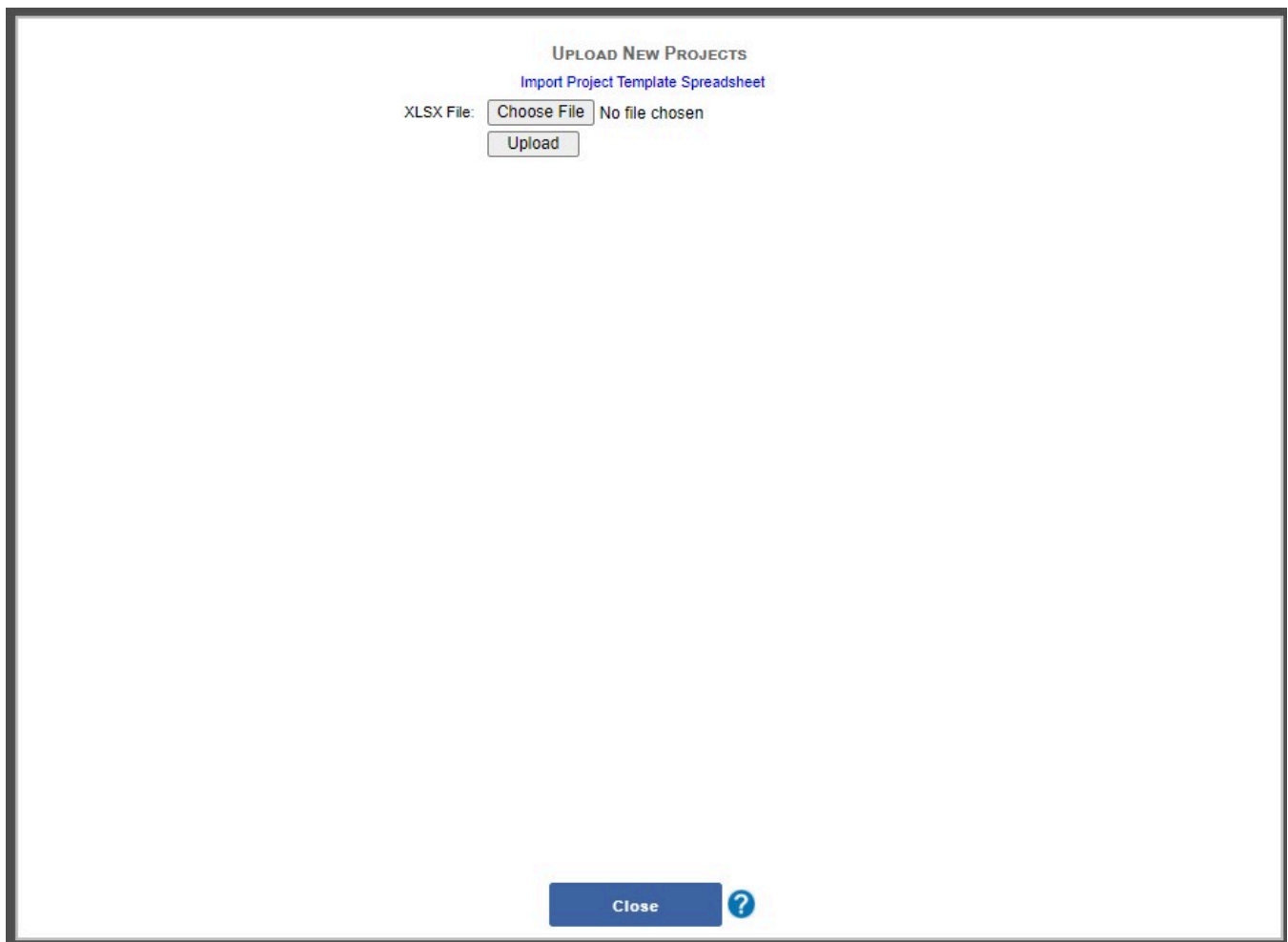
Import Projects

Compare Projects

Multi-criteria Compare

Browsing for Import File

In the Upload New Projects window, click the *Choose File* button, then use the browser to find the import file in your system



The Upload New Projects Window in File-Select Mode

In the Upload New Projects window, you will be presented with a list of all projects that are contained in the spreadsheet. On this screen, check off projects you want to import. Then click the *Import Selected Projects* button.

UPLOAD NEW PROJECTS

[Import Project Template Spreadsheet](#)

XLSX File: No file chosen

Uploaded Projects

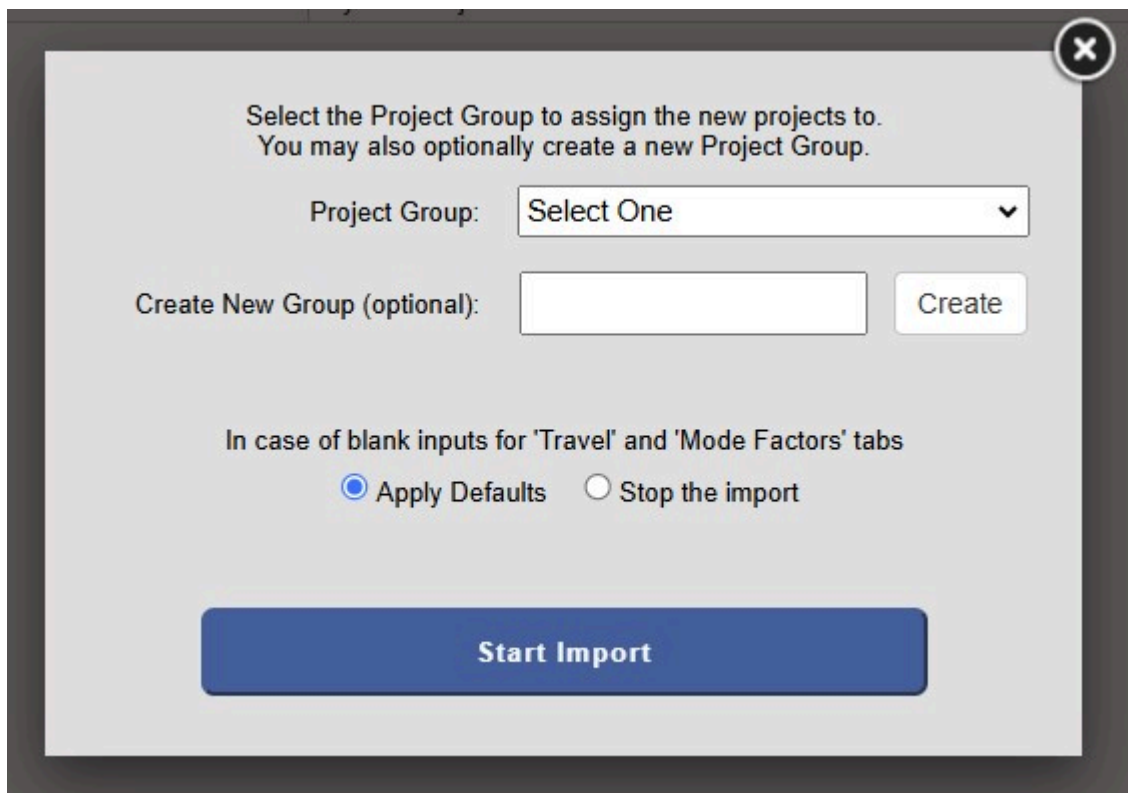
No.	☐	Import Completion Date	Project Name	Status
1.	☒	---	Project 101	
2.	☒	---	Project 102	
3.	☐	---	Project 103	
4.	☐	---	Project 104	
5.	☐	---	Project 105	

The Upload New Projects Window in Project-Select Mode

The *Import Options* window will appear. First, select which Project Group to import the projects. You can create a new group on the fly by entering a new group name and clicking the *Create* button.

Another radio button toggle allows you to decide if empty values will be filled by a default or stop the import process.

Once the project group is set and any desired settings adjusted, press the *Start Import* button to initiate the process.



The screenshot shows a dialog box titled "Import Options Window" with a close button in the top right corner. The window has a light gray background and a dark gray border. The text inside reads: "Select the Project Group to assign the new projects to. You may also optionally create a new Project Group." Below this, there is a "Project Group:" label followed by a dropdown menu showing "Select One" with a downward arrow. Underneath, there is a "Create New Group (optional):" label, a text input field, and a "Create" button. Further down, there is a section titled "In case of blank inputs for 'Travel' and 'Mode Factors' tabs" with two radio buttons: "Apply Defaults" (which is selected) and "Stop the import". At the bottom of the window is a large blue button labeled "Start Import".

Select the Project Group to assign the new projects to.
You may also optionally create a new Project Group.

Project Group:

Create New Group (optional):

In case of blank inputs for 'Travel' and 'Mode Factors' tabs

☒ Apply Defaults ☐ Stop the import

The Import Options Window

As the projects are imported, their status you will see the status on the project list screen.

Compare Projects

The *Project Comparison* feature allows you to compare analysis results across up to 30 selected projects. It can be used as a check on the validity of your inputs to TREDIS and to easily find significant differences with respect to economic impact and benefit costs.

The left side of the screen is a menu that allows you to move between comparison reports.

Project Selection

When you first click on the *Compare Projects* button, a new window opens which lists all projects that have been analyzed for the current contract and project group. At the top of the screen, you are able to select another contract or group if they exist, which will repopulate the project list.

If you do not see a project in the list, go back to the project screen and check to see if the project has been analyzed. You may either click on results to run the analysis, or if you have multiple projects to analyze, use the multi-run feature within group options on the project page.

PROJECTS SELECTION

TIMING

STUDY REGION

ECONOMIC IMPACT

BENEFIT - COST

TRAVEL DATA

COST DATA

TREDIS

PROJECTS SELECTION

Current Contract: Implan 2018 TestCurrent Group: Compare Group

☐ Project Group

Project Name

Project Owner

Mode

Creation Date

Last Modified

1. ☐ Compare Group

Project 101

skamin-demo2

Shared

9/10/2020 3:34 PM

9/11/2020 2:54 PM

2. ☐ Compare Group

Project 102

skamin-demo2

Shared

9/10/2020 3:34 PM

10/2/2020 10:37 AM

3. ☐ Compare Group

Project 102A

skamin-demo1

Private

10/6/2020 9:40 AM

10/6/2020 4:05 PM

4. ☐ Compare Group

Project 103

skamin-demo2

Shared

9/10/2020 3:34 PM

10/7/2020 7:13 AM

5. ☐ Compare Group

Project 104

skamin-demo2

Shared

9/10/2020 3:34 PM

9/30/2020 10:21 AM

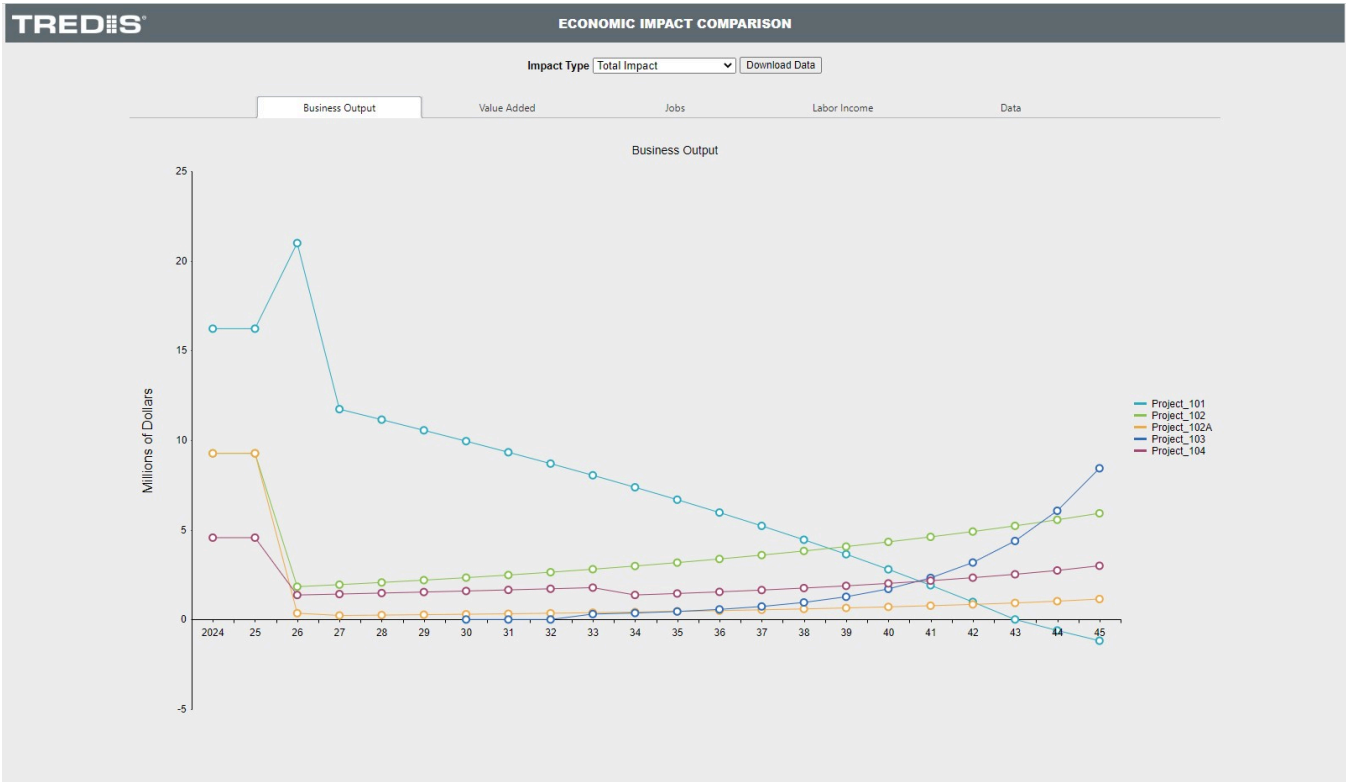
Run Comparison

For up to 30 projects

Settings

Select the projects you wish to view, up to a maximum of 30, and then click on the Run Comparison button. You will then be directed to the Economic Impact Comparison Screen.

Economic Impact

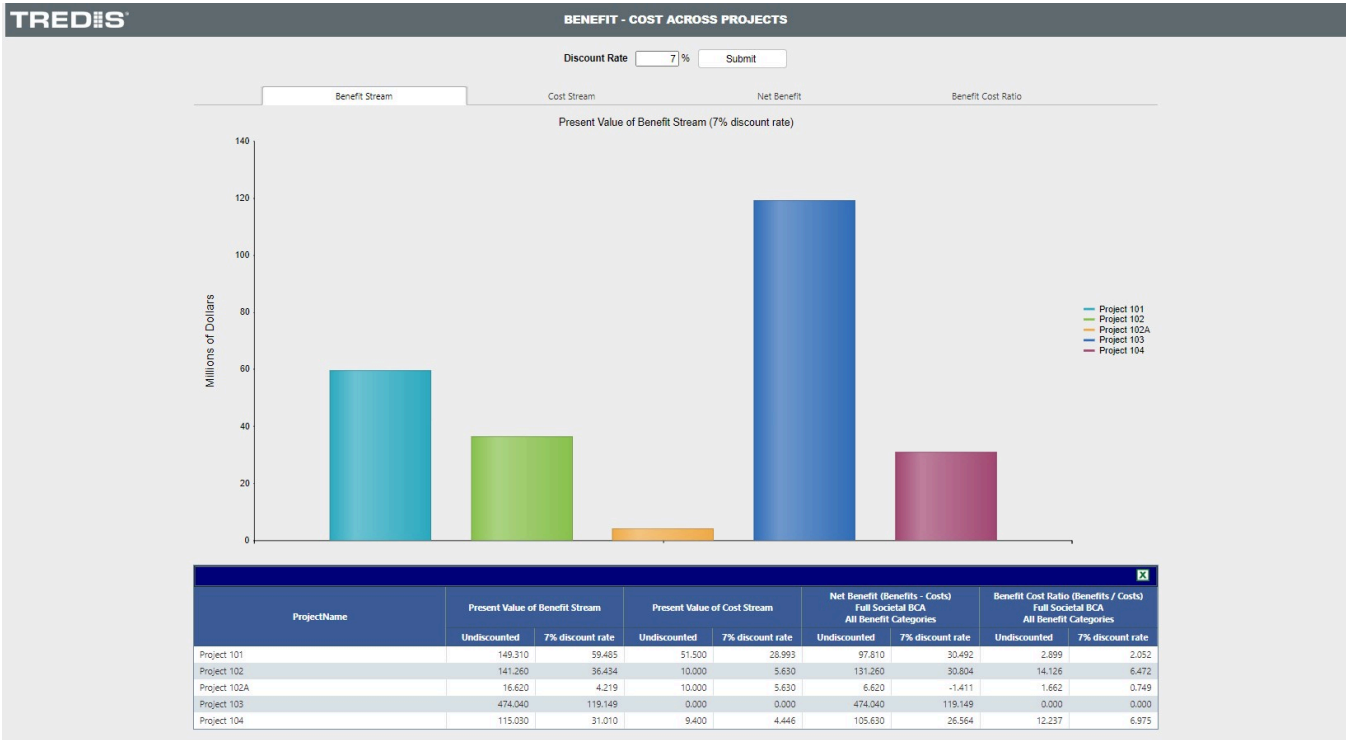


Economic Impact Comparison

As seen on the picture above, you may select the Impact Type from the dropdown menu, to show the total impact, or filter by construction, operations, market access, or contingent development. Clicking on the Download Data button will export the data used in creating the graphics on the page for the impact type selected.

The chart on the screen will present business output (\$M), value added (\$M), Jobs, and Labor Income (\$M) over time, depending on which tab is selected. The data tab shows a simple table of the results for the results year selected in the analysis settings.

Benefit Cost

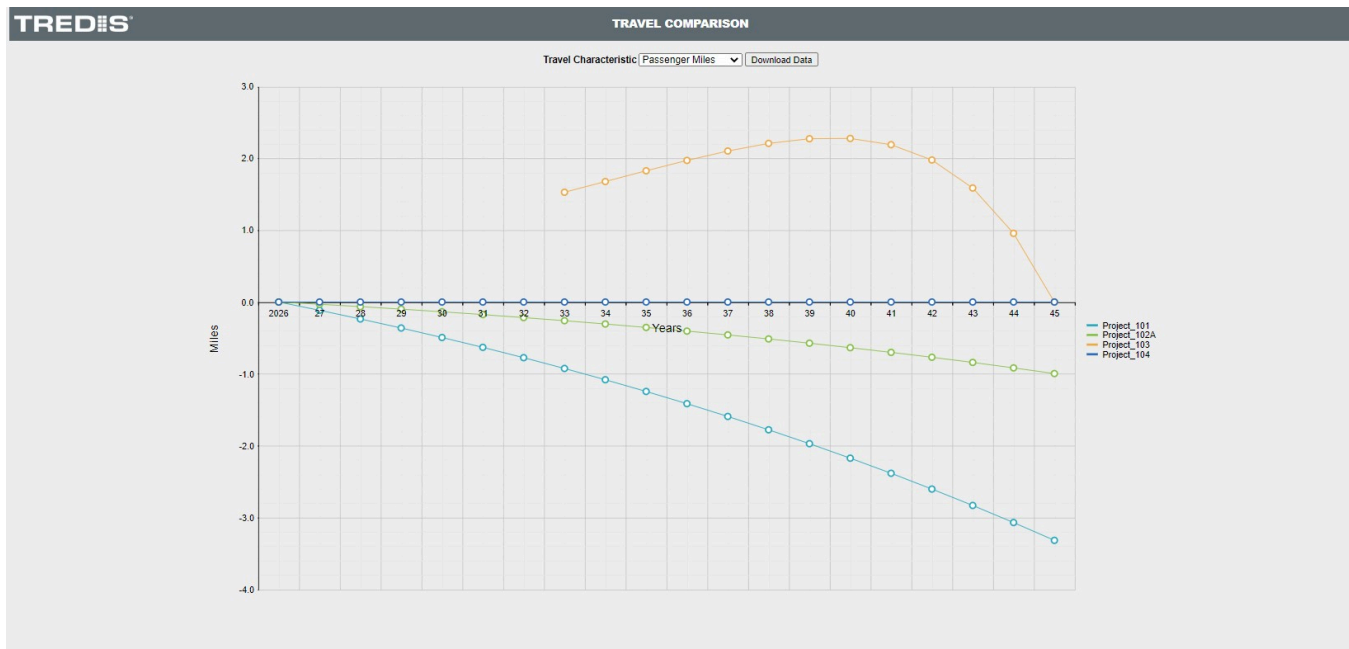


Benefit Cost Comparison

Clicking on the *Benefit-Cost* tab on the left menu presents the graphical view of the Benefit Stream, Cost Stream, Net Benefit, and Benefit Cost Ratios, with a table of the data at the bottom of the screen.

At the top of the screen, you may change the discount rate by entering a value and clicking the submit button. Entering 0 will show the undiscounted values.

Travel



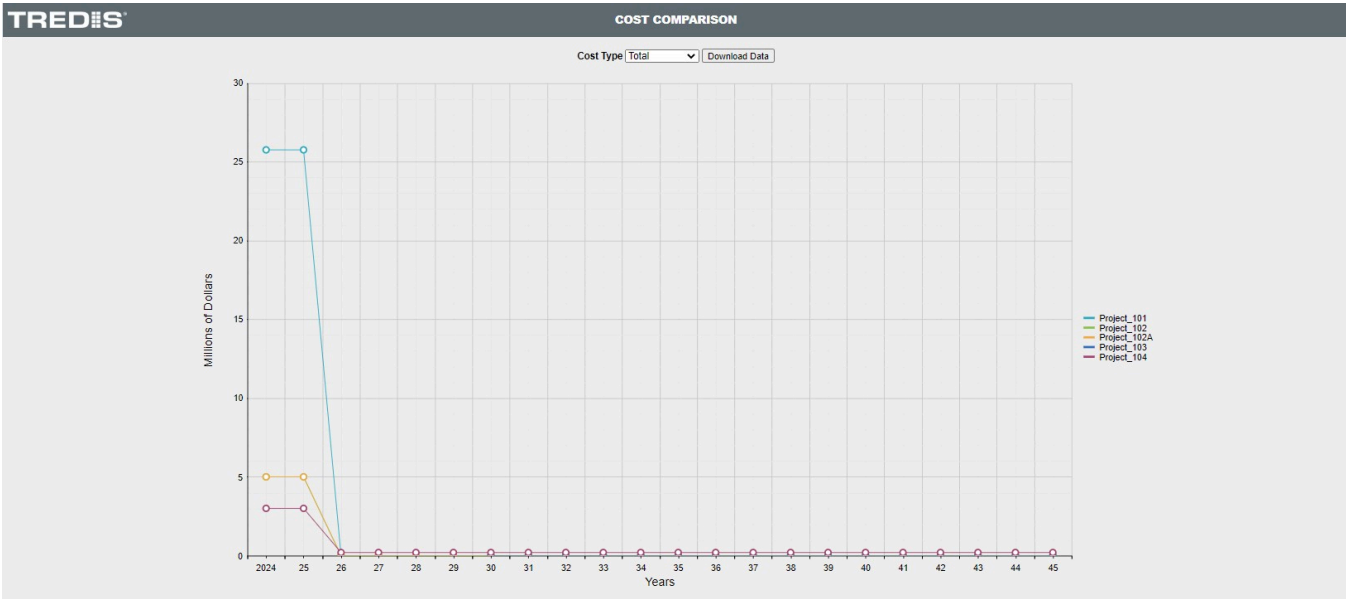
Travel Comparison

The *Travel Comparison* tab shows the travel inputs (difference of project less base) over time for

- Gross Vehicle Trips
- Passenger Trips
- Freight Ton Trips
- Gross VMT
- Passenger Miles
- Freight Ton Miles
- Gross VHT
- Passenger Hours
- Freight Ton Hours

Select which view you wish to see using the dropdown menu. Also download the data over time using the download data button.

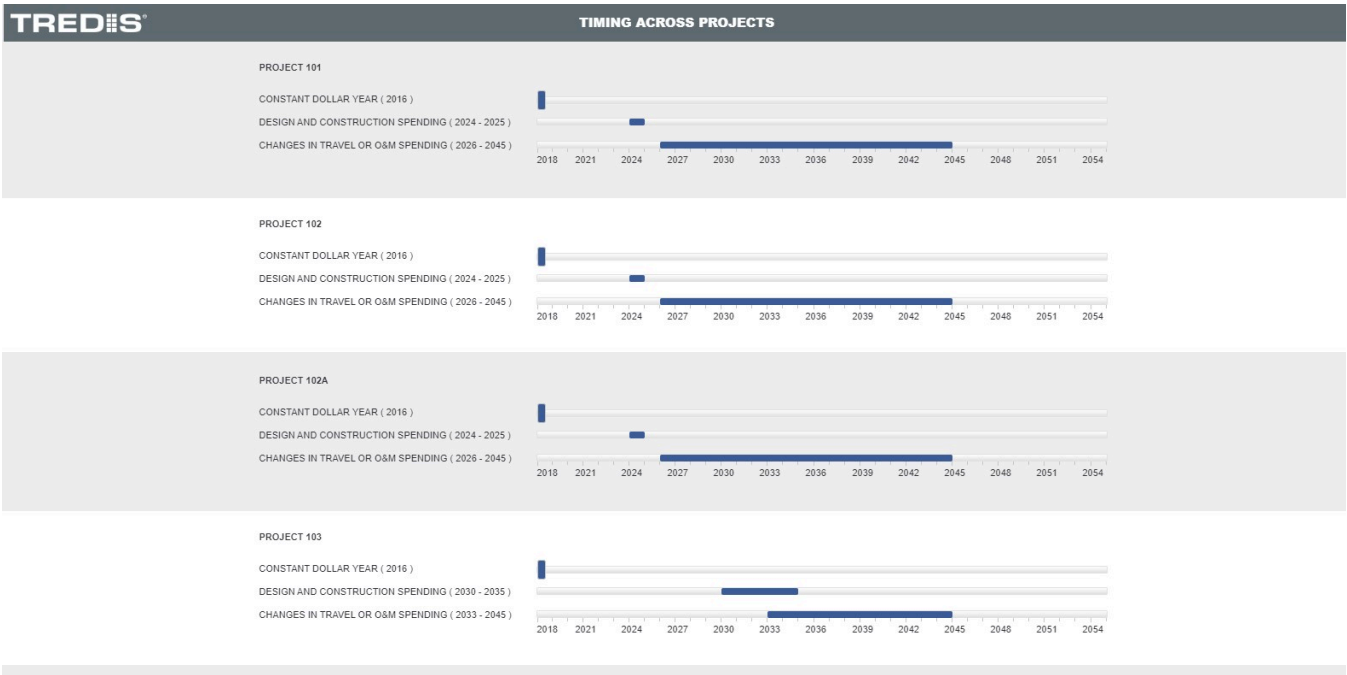
Cost



Cost Comparison

The *Cost Comparison* tab shows the total costs, construction costs, or operational costs over time for the selected projects. Use the dropdown menu to select which cost type is of interest and the Download Data button for the raw data.

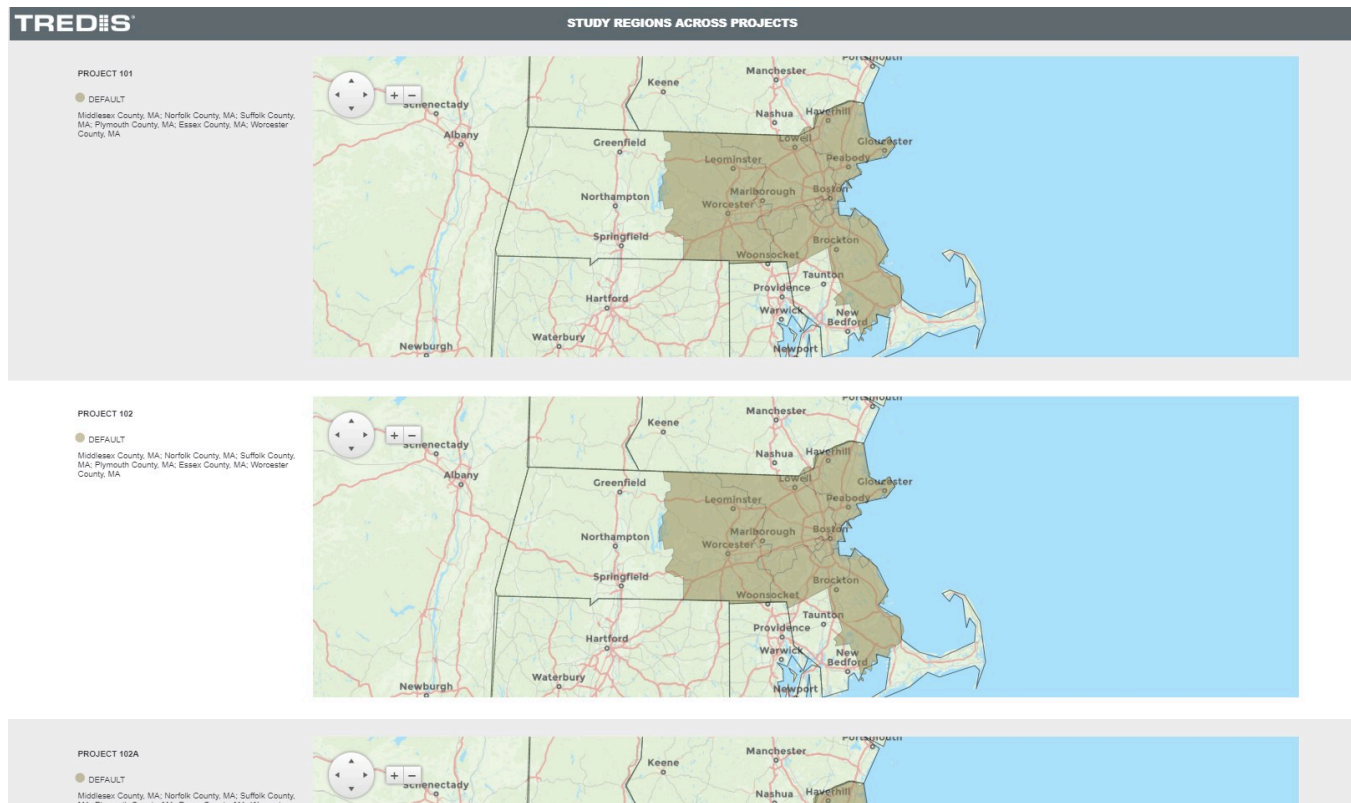
Timing



Timing Comparison

The *Timing* tab shows the construction and operations periods of each selected project, along with the constant dollar year used to enter data.

Study Regions



Region Comparison

The *Study Region* tab presents a list and a map of the study regions for each selected project.

Multi-criteria Compare

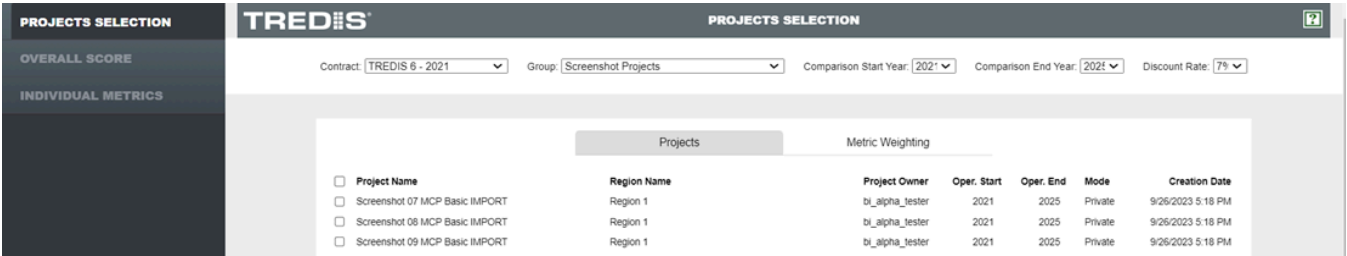
The Multi-criteria Compare feature allows you to prioritize projects by weighting competing priorities.

When you first click on the *Multi-criteria Compare* button, a new browser window opens to the tool. On the left are the top-level navigation tabs – *Projects Selection*, *Overall Score*, and *Individual Metrics*.

The left side of the screen is a menu that allows you to move between steps reports.

The *Projects* tab on the *Projects Selection* page is the landing screen.

Projects Selection



The Projects Selection Page, Projects Tab

Start by selecting the projects you want to compare.

Contract. Choose the Contract which contains the groups with the projects to be compared.

Group. Choose the Group which contains the projects to be compared.

Comparison Start Year/Comparison End Year. Choose the period of analysis; data outside of these years will be disregarded for the analysis.

Discount Rate. Select the discount rate to be used in the analysis.

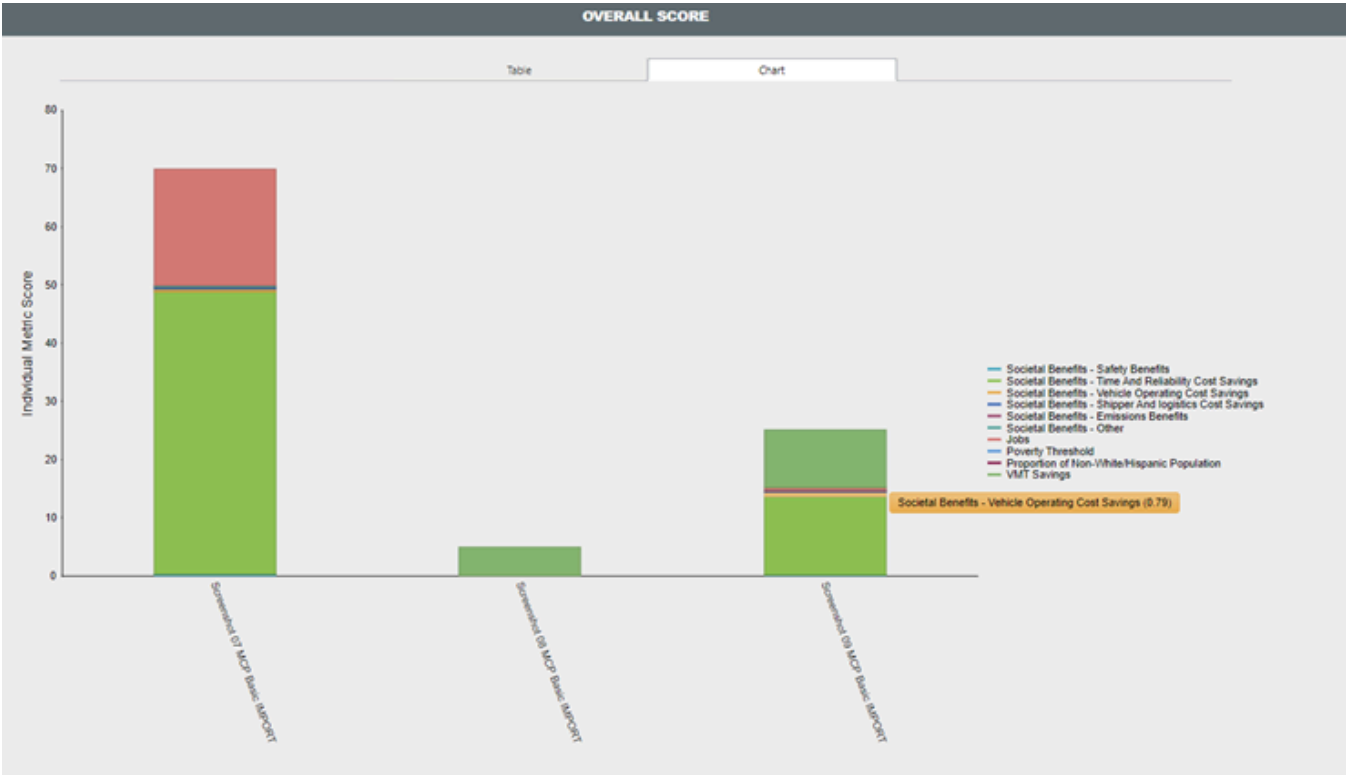
On the *Metric Weighting* tab, select the weights for each category of evaluation. The upper tier of weights entered must add to 100%. The bottom tier is only the relative weighting of factors within the larger Societal Benefits category. These are weighted just with integer weights, but there is no constraint on their sum.

this is normalized and scaled relative to all the societal benefit components across all projects. For Societal Benefits row, this represents the components added then scaled among the totals.

Weight. Weights chosen in the Projects Selection screen.

Individual Score. The final score for the component. For Societal Benefits, this is scaled again to produce the total Individual Score for Societal Benefits.

The *Charts* tab shows scoring data as a bar graph.



The Overall Score Page, Charts Tab

The legend at right allows the user to toggle on or off components of interest, and hovering over a bar section will display a score (as in the illustration, where a label for the Vehicle Operating Cost Savings appears). For Societal Benefits, this score is further scaled to represent its final contribution to the individual score.

Individual Metrics

The individual metrics page allows you to perform tracing on the source of individual metrics. The *Category* dropdown allows you to choose the component of interest, "Jobs" or "Social Benefit".

INDIVIDUAL METRICS				
Category Jobs				
Project :	Cost (\$M) :	Raw Metric Value :	Normalized Metric Value :	Scaled and Normalized Metric Value :
Screenshot 07 MCP Basic IMPORT	\$87.74	215	2	100
Screenshot 08 MCP Basic IMPORT	\$87.74	165	2	0
Screenshot 09 MCP Basic IMPORT	\$87.74	166	2	2

The Individual Metrics Page, Jobs View

Cost (\$M). Total discounted project cost.

Raw Metric Value. Values taken directly from project results.

Normalized Metric value. Values after normalization (where values are divided by cost to provide per-dollar metric). For Societal Benefits, reported Normalized Metric Value has already scaled to the value of the project with the highest Normalized Societal Benefits in order to be consistent with the overall scoring process.

Scaled and Normalized Metric Value. Values after normalization and scaling (where normalized values are adjusted to a score of 0 to 100 based on the minimum and maximum of the component).

INDIVIDUAL METRICS				
Category Societal Benefits				
Project :	Cost (\$M) :	Raw Metric Value :	Normalized Metric Value :	Scaled and Normalized Metric Value :
Screenshot 07 MCP Basic IMPORT	\$87.74	39,585,640	100	100
Screenshot 08 MCP Basic IMPORT	\$87.74	18,953,459	48	0
Screenshot 09 MCP Basic IMPORT	\$87.74	24,989,151	63	29

The Individual Metrics Page, Social Benefit View

Timing

The *Timing* page in TREDIS provides interfaces for setting the time periods in your project, as well as analysis segments.

Project Timing

Construction Years and Operations Years in your project can be set by clicking on the handle on the range of years and dragging left or right.

PROJECTTIMINGREGIONSMODESCOSTSTRAVELACCESSRESULTS

Project Timing

Construction Years (2019 - 2020)

Operations Years (2019 - 2042)

20192022202520282031203420372040204320462049

Constant Dollar Year: 2019

Inventory Interest Rate: 8 %

Save

Analysis Segments

A segment may be a time period (annual, peak, off-peak, etc.), a population segment (EJ, low-income, etc.), or other criteria to track specific segments in inputs and results. TREDIS requires at least one analysis segment. If you need additional Analysis Segments, enter a name in the box below and then click on the Add button.

Segment Name

Annual

renamedelete

Segment

Add

Timing Page

Construction Years are when capital and design costs are modeled, for both spending and impacts.

Operations Years are when recurring maintenance and operations costs and impacts are modeled.

Construction Years and Operations Years may overlap for as long as needed. For example, a road widening might open a portion of the road to use mid-construction, at which point travel and operational costs may be relevant while construction costs and impacts are still modeled as well.

The **Constant Dollar Year** is the date corresponding to the contract and defines the dollar year of all inputs and results. In a TREDIS contract with the year 2024, the underlying economic data set used for economic relationships will be based in 2024 data, and all inputs and results will be in 2024 dollars.

The **Inventory Interest Rate** is a percentage representing the interest rate of private capital, which will be used for calculations of freight cost logistics. It is not recommended to change this except under special circumstances and in consultation with TREDIS support, since the default is the basis of calibration for components of the logistics model.

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Analysis Segments

TREDIS allows you to divide your travel into segments to see how distinct groups of travelers affect the benefits and impacts of the entire system. All segments are added together to make up the entire analysis, so any one segment may not be a subset of another. Common uses of segments include differentiating periods of the day – e.g. "AM Peak" and "PM Peak" segments – or demographic groups – e.g. "EJ population" and "Non-EJ population" segments.

Each mode and region will be repeated on the Travel page for each segment defined, and some reports likewise give data on each segment separately (as well as a total of all segments). For example, if weekday Passenger Car - Personal travel makes up only a portion of traffic on weekdays, but nearly all of travel on the weekends, a "Weekday" segment and a "Weekend" segment will allow you to both enter and track the periods separately.

Keep in mind that activity in one segment doesn't affect activity in the other, even when divided into sequential segments, such as time of the day, so that a period labeled "AM Peak" will have no effect on another labeled "PM Peak".

Regions

The *Regions* page is the interface for determining the geographic Regions to be used in the TREDIS analysis, as well as for managing Regional Definitions to be used and re-used across projects.

Geographic Units in TREDIS

A TREDIS license is associated with specific counties, defined when the license is set up. Additionally, a license may have access to custom geographies, usually subcounty areas, if your license is set up to provide them. In any case, these are the basic building blocks used to build economic regional models, and each geography has its own detailed economic data, with metrics for hundreds of individual economic sectors.

Whether county-based or subcounty-based geographies are being used, they can be combined to form a Region in TREDIS. This is the smallest unit of geography for a TREDIS analysis, and any results reported by geographic area will be reported on by Region.

There are many reasons you might group smaller geographies into Regions. The following use cases represent some of the most common examples.

- You are interested in seeing the impacts of road improvements across the state, so you select all the counties in the state to make a single Region.
- You want to know the impact of bridge investments within the counties of a single MPO, but you also want to know if there are secondary economic impacts on the rest of the state. You create one Region with all the counties in the MPO, and another Region labeled "Rest of State" for all the other counties in the state.
- You want to know the impacts of a rural transit system on a single county, and you don't have any reason to look into impacts outside of that county. You select the county by itself to create a single Region.

A project must have a minimum of one Region, and each Region must be comprised of at least one geography (that is, at least one county or sub-county area). No two Regions may share the same geography, because allowing them to would mean you might inadvertently double-count any impacts or benefits associated with a single county or sub-county area.

Using the Interface

To define and build the economic model you'll need for a TREDIS analysis, complete the following steps.

Defining Regions

Aside from the default single Region that is provided whenever you create a project, you can add other regions with the *Add Region* button at top left. Each region is represented by a Region tile at the left, and each Region has a distinct color. In the screenshot, there are four Regions created, each colored on the map. Notice that some Regions have multiple counties associated with them, while one, "Worcester," is a single county.

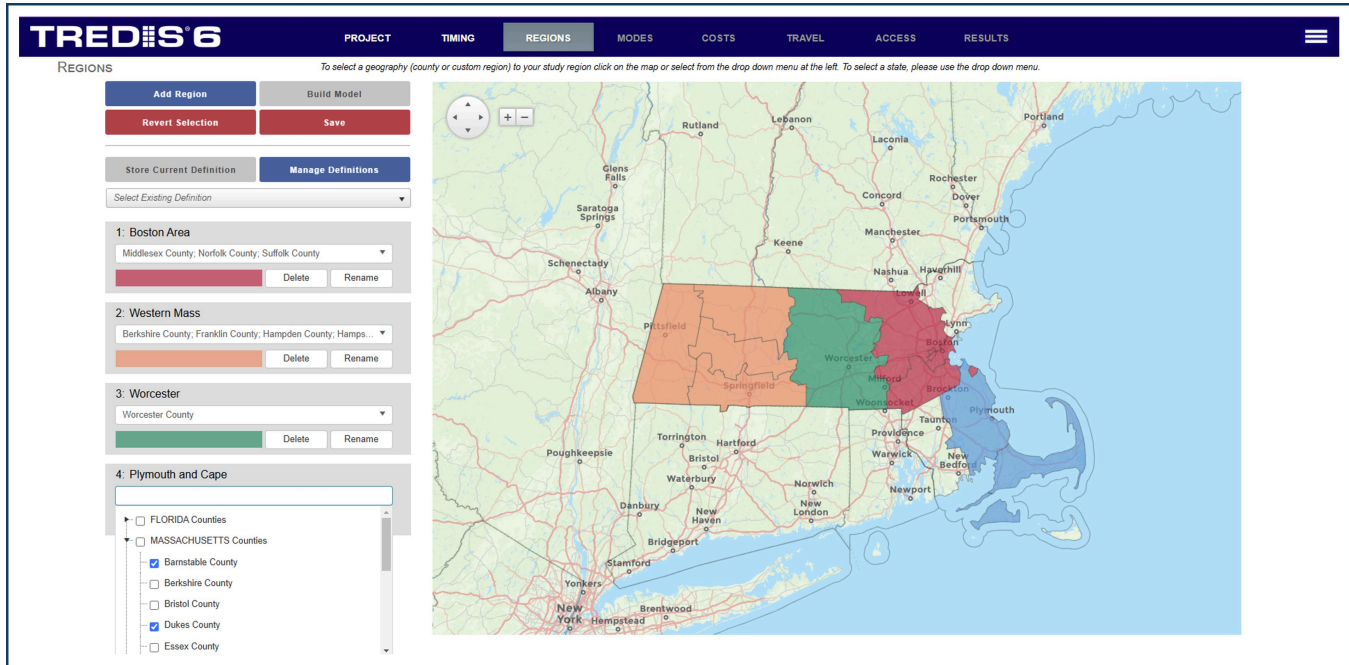
In this example, the Regions have already been defined, and the counties that belong to them have already been selected. To do this in your own project, you can use one of two methods:

- Select the colored bar within the Region tile at left, and click on the map to add a county to the Region.
- Click on the dropdown menu within the Region tile and check boxes to add geographies to the Region.

In the screenshot, the first Region, named "Boston Area," is represented by the color red, and the counties associated with it are colored red on the map.

The last Region tile, for "Plymouth and Cape," has an open dropdown menu where the counties associated with it are already checked off, and other counties can be added.

On each Region tile, you can click the *Rename* button to relabel it, or *Delete* to get rid of the Region entirely.

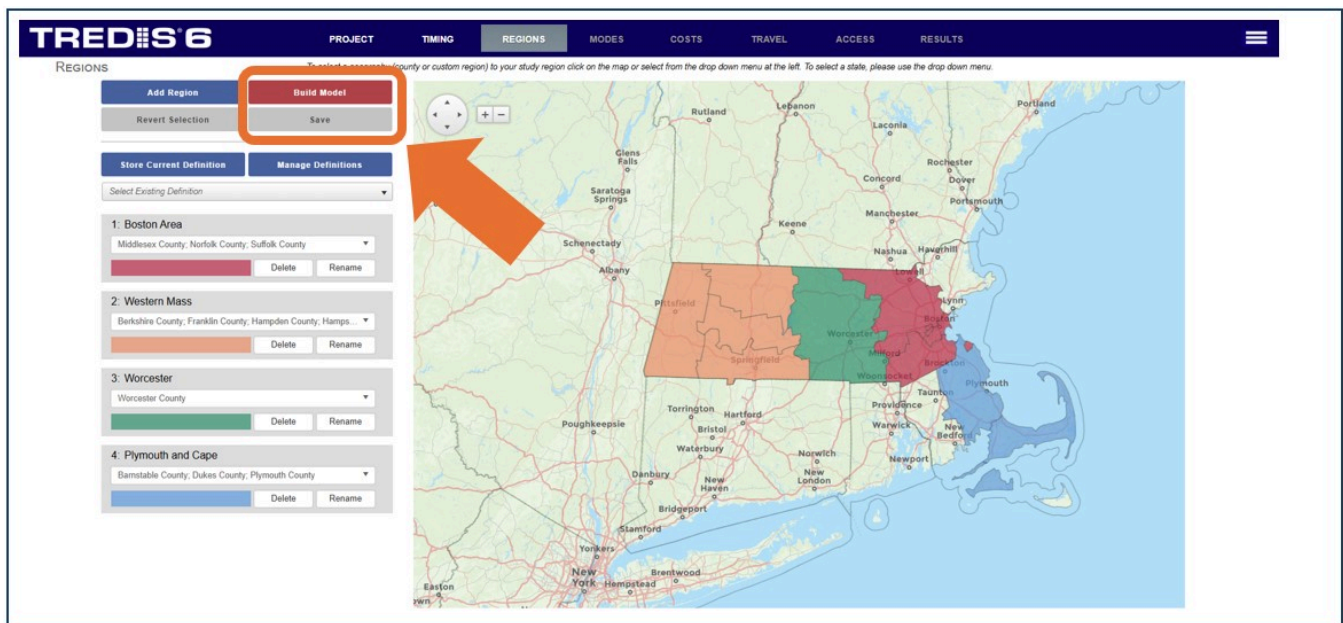


Defining Regions

Saving Definitions

Once you are satisfied with the Regions you have defined, confirm your selections by clicking *Save*. Alternatively, you can click *Revert Selection* to get rid of any changes since your last save.

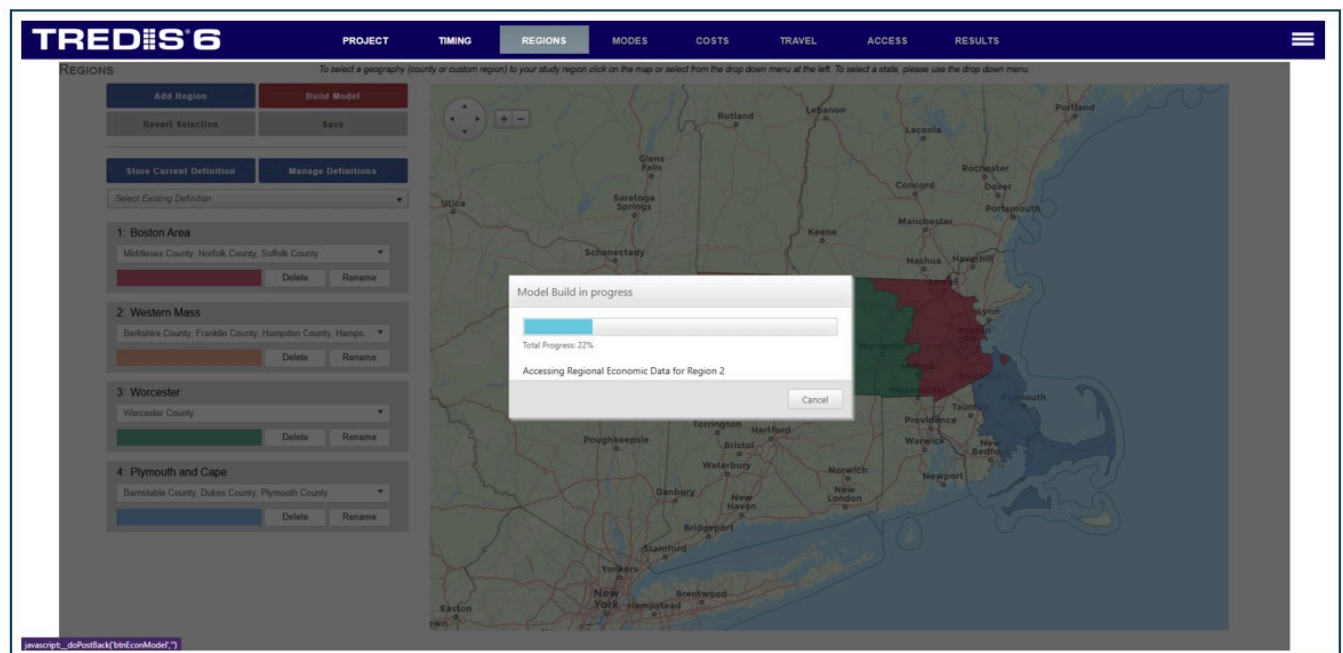
After you've saved the current definition, the *Save* button will appear gray to signify that the current definition is ready to be used to build the economic model. The *Build Model* button is now highlighted to indicate you are ready to build.



The Save and Build Buttons

Build the Model

By clicking the Build Model button, you will launch the build process. This may take a few moments and you will see the progress indicator while it is proceeding. Once finished, the regular interface reappears and the button label changes from *Build Model* to *Model Complete*.



Building the Model

Reusing Regional Definitions

Regional Definitions may be reused between projects, allowing you to quickly select an existing definition of Regions - one or many - that you've previously stored, without having to click each county in the checkmark lists or on the map. Users may want to store definitions when they will be used frequently, especially across users or in a common business process.

What are Regional Definitions?

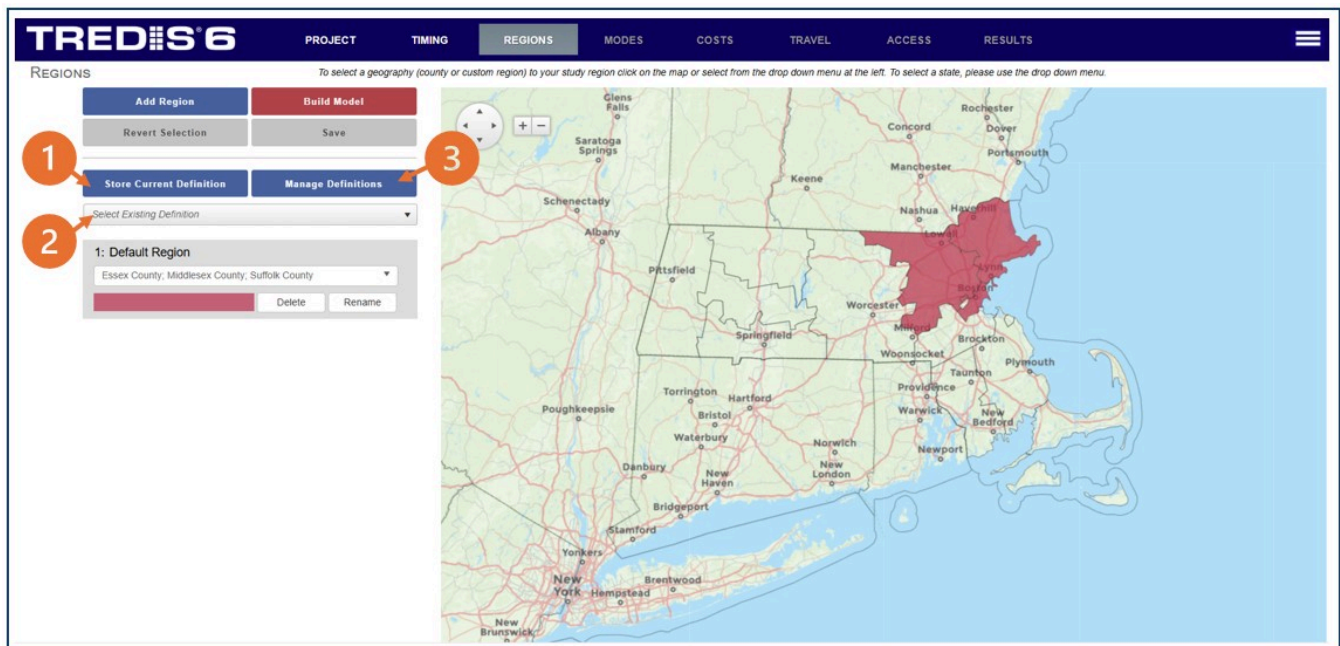
The defined Regions that are saved together when you click the **Save** button constitute a single Regional Definition in TREDIS. The economic model, which is built by TREDIS when you click *Build Model*, uses the Regional Definition to create the model used.

A single Regional Definition might involve a single region or multiple regions, but there is only one definition associated with any given TREDIS project. Each region may include one or more counties (or custom components such as subcounty areas). Like projects, Regional Definitions are stored at the contract level, so that other users that share a license may access the same Regional Definitions.

Regional Definition Controls

There are three controls with Regional Definitions:

1. The *Store Current Definition* button stores a definition.
2. The *Select Existing Definition* dropdown selects and loads a definition previously stored.
3. The *Manage Definitions* button opens an interface to view and delete stored definitions.



Regional Definition Controls

Storing a Definition

Click the *Store Current Definition* button to make the current Regional Definition available across projects and to other users.

A window prompt will ask you for a name to assign the Regional Definition so it can be referred to later. Once you enter a name and click Create, this Regional Definition will not be available in the *Select Existing Definition* dropdown to you and other users of your contract.

A Regional Definition must be saved before it can be stored. Storing a definition for later use is different from the effect of the Save button, which just confirms the use of the current definition for the TREDIS project you're currently working on. For an existing project, you will probably have already saved the Regional Definition, and the Save button will be greyed out, as in the figure below. For a new project, you will want to create a Regional Definition as you normally would and click Save. Once you have saved a Regional Definition, click the *Store Current Definition* button to store it.

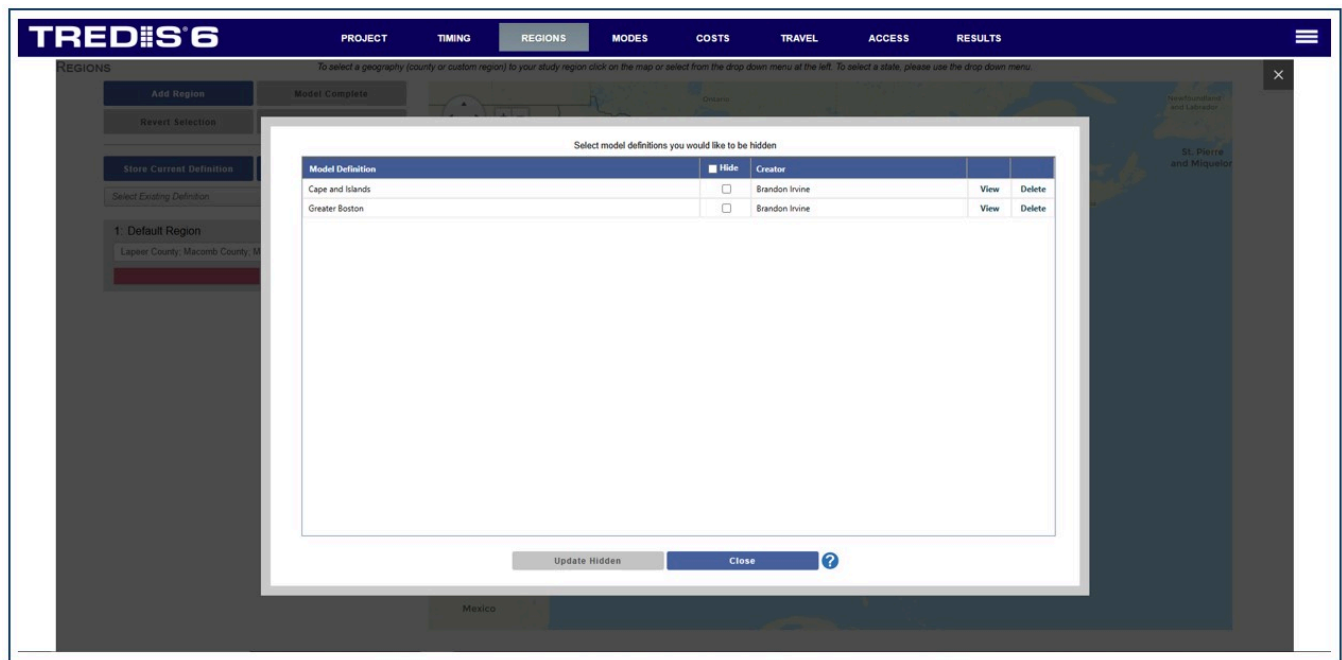
Selecting an Existing Definition

For the TREDIS project you are currently working in, if you want to re-use a Regional Definition that has already been created and stored, click on the *Select Existing Definition* dropdown and select the Regional Definition from the list.

When you select a Regional Definition from the dropdown, TREDIS will prompt you with a warning that whatever the current Regional Definition is - whatever is being shown on-screen currently - will be discarded to load the selected Regional Definition. Select Yes to continue and load the Regional Definition selected.

Managing Definitions

Definitions are stored at the contract level, which means they're associated with the data year in the contract name. (For example, "TREDIS - 2024" would be for data from 2024.) Other users on the same contract can select and use them. To see all the Regional Definitions associated with the contract, click the *Manage Definitions* button to open a new window.



The Manage Definitions Window

To hide definitions (so they don't appear in the *Select Existing Definitions* dropdown), click the *Hide* next to the name of the Regional Definition. When you're done changing the status of any Regional Definitions, click *Update Hidden*. To see definitions that were previously hidden, uncheck the boxes and click *Update Hidden*. To view the counties (or county equivalents) associated with a Regional Definition, click *View* on the row of the definition to open a window with that information.

Finally, if you are the creator of a Regional Definition, you may click *Delete* to do so. A prompt will confirm your choice before the Regional Definition is actually deleted. Other projects using the definition will not be affected analytically, but their Definition will be considered project-specific and unlabeled.

Modes

The next step in using TREDIS is to select the Modes of transportation and the associated Purposes for your analysis. Using the check boxes contained on this page, simply check the box in the appropriate row and column.

The double downward arrow icon at the left side of a row indicates that there are detailed modes that may be chosen. Click on this icon to expand the list.

Select the Mode-Purpose combinations from the table below.

Manage Mode Defaults

Save

	Modes	No Split	Business	Personal	Commute	Freight
▾	Auto - All					
	--- AV TNC		☐	☐	☐	
	--- Electric Car	☐	☐	☐	☐	
	--- Good Pavement	☐	☐	☐	☐	
	--- Passenger Car	☐	☐	☒	☐	
	--- Passenger Car - Federal Grants	☐	☐	☐		
	--- Passenger Car - HOV	☐	☐	☐	☐	
	--- Passenger Car - SOV	☐	☐	☐	☐	
	--- Poor Pavement	☐	☐	☐	☐	
	--- Taxi		☐	☐	☐	
	--- TNC		☐	☐	☐	
+	Bus - All					
+	Truck - All					☒
+	Train - All					
+	Active - All					
+	Aircraft - All	☐	☐	☐	☐	☐
+	Ship - All					

Add Custom Mode Purpose Types (Show Content...)



Adjust Mode Factors

The Modes Page

The blue Save button changes to orange to indicate a change has been made and the button needs to be pressed to save the change. Click [Manage Modes](#) button to open new window to hide, view, or edit Modes associated with the Contract you are currently using.

Add Custom Modes

Clicking on the *Add Custom Mode Purpose Types* bar will expand the screen to allow you to create a new mode-purpose combination based on an existing one.

Add Custom Mode Purpose Types (Hide Content.)

New Mode Name

Template Mode Type

Please Select

Template Mode

Fuel Type

Please Select

TREDIS only updates fuel price & taxes based on fuel type. User can further modify fuel consumption, emissions, etc.

Add

Adding Custom Modes

Provide a name for the new Mode, select a mode type from the dropdown menu and then select an existing mode to use as the template to create your new Mode. Once you have created your new Mode, by clicking the *Add* button, you may then update the fixed factors using the *Manage Modes* button at the top right of this page.

Custom modes are shared among all users in your account. Once created they may not be deleted, though the creator may change the default characteristics of the custom mode.

Adjust Mode Factors

Clicking on the [Adjust Mode Factors](#) button allows you to change the project defaults for the modes selected in the project.

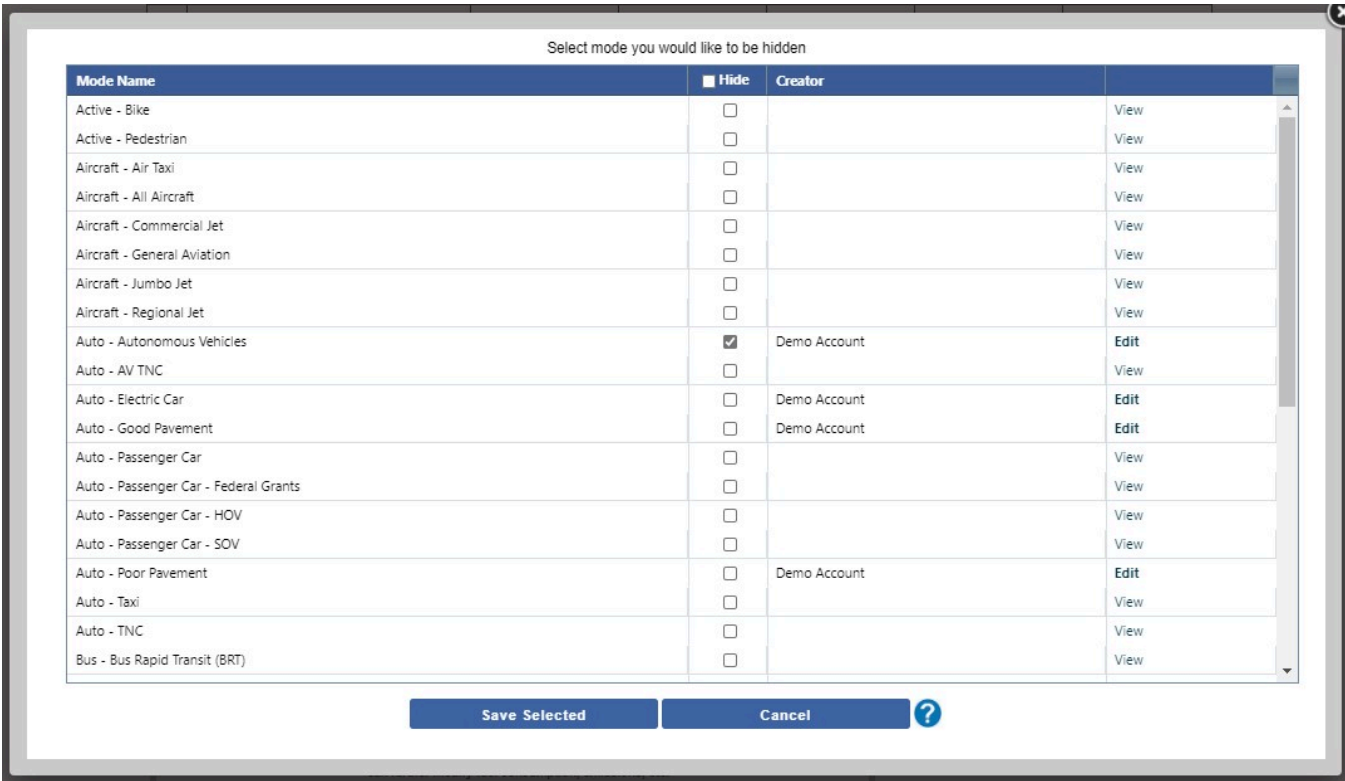
Only mode-purpose combinations selected are displayed and the changes apply only for the current project. Once you have finished entering your changes, click the *Save* button at the bottom of the screen. Use the *Close* button to exit the screen.

Manage Modes

The *Manage Modes* window allows you to view the default fixed factors for all default modes, including those created by others in your account, and to update the values for any custom mode that you created.

The page shows all modes, both default and custom, with a checkbox that allows you to hide those modes that you do not need. For example, if you only deal with highway projects, then you can hide modes that are appropriate for air, marine, and rail, to reduce the clutter on your *Modes* page.

In addition, you can see who created the custom modes on the Contract you are using. In the figure below, the custom mode "Auto - Autonomous Vehicles" was created by user "Demo Account." If you are logged in as "Demo Account," you will see the *Edit* button to edit the defaults of the mode. Anyone who uses this mode after the change will see the new values. Older projects will use the previous values.



Selecting Modes to Show

Once you have made your changes, click the *Save Selected* button to return to the *Modes* page.

You may also view the default values for the TREDIS default modes or custom modes created by users in your account. If you are the owner of the custom mode, then you are able to edit the default parameters.

Select the *View* link or *Edit* link as appropriate, which will open a window with the defaults to adjust. This interface is the same as the one for the [Adjust Mode Factors](#) interface, except the defaults for each new project created with the mode will use those as the initial defaults.

Adjust Mode Factors

This screen allows you to change the default values within the current project for those modes which have been selected. Once you have finished entering your changes, please click the **Save** button at the bottom of the screen. Use the **Close** button to exit the screen.

Time Value

Facility	Mode	Purpose	Fuel Type	Crew Cost Factor \$ per person-hour	Passenger Cost Factor \$ per person-hour	Buffer Time Cost Factor \$ per person-hour	Out Of Vehicle Transfer Cost \$/hr	Lease Cost Per Hour (Low)	Lease Cost Per Hour (Medium)	Lease Cost Per Hour (High)
Road	All Trucks	Freight	Diesel	30.42	0.00	52.80		0.00	10.21	10.21
Road	Bus Rapid Transit (BRT)	Commute	Diesel	31.35	25.47	0.00	25.47			
Road	Passenger Car	Business	Gasoline	0.00	37.10	37.10				
Road	Passenger Car	Commute	Gasoline	0.00	25.47	25.47				
Road	Passenger Car	Personal	Gasoline	0.00	12.74	12.74				

Time Value Factors

- **Crew Cost Factor.** Value of time in \$/hour of crew.
- **Passenger Cost Factor.** Value of time in \$/hour of passengers, for each passenger.
- **Lease Cost Per Hour (Low, Medium, High).** \$/hour in lease costs for vehicles for Low, Medium or High Sensitivity goods freight.
- **Buffer Time Cost Factor.** Value of time cost in \$/hour of buffer time.
- **Out of Vehicle Transfer Cost Factor.** Value of time cost in \$/hour of out-of-vehicle transfers.

Environmental

Facility	Mode	Purpose	Fuel Type	Grams per VMT VOC	Grams per VMT NO _x	Grams per VMT SO ₂	Grams per VMT PM 2.5
Road	All Trucks	Freight	Diesel	0.44	5.30	0.01	0.16
Road	Bus Rapid Transit (BRT)	Commute	Diesel	0.29	4.43	0.01	0.11
Road	Passenger Car	Business	Gasoline	0.13	0.20	0.00	0.01
Road	Passenger Car	Commute	Gasoline	0.13	0.20	0.00	0.01
Road	Passenger Car	Personal	Gasoline	0.13	0.20	0.00	0.01

Environmental Factors

- **Grams per VMT (VOC, NO_x, SO₂, PM 2.5).** Grams per vehicle mile traveled.

- **VOC, NOx, SO2, PM2.5 Congestion Penalty Ratio.** Ratio of pollutant produced under congested conditions over weight of pollutant produced under free-flow conditions.

Fuel Consumption

Time Value Environmental Fuel Consumption Occupancy Safety Other Cost Logistics						
<div>Cancel Changes</div> <div>All \$ inputs should be entered as constant 2019 Dollars</div>						
Facility	Mode	Purpose	Fuel Type	Congested to Free Flow Consumption Per Mile Ratio	Congested Hour to Congested Mile Ratio	Fuel Penalty for Ratio on Poor Pavement
Road	All Trucks	Freight	Diesel	1.4000	50.0000	1.03
Road	Bus Rapid Transit (BRT)	Commute	Diesel			1.03
Road	Passenger Car	Business	Gasoline	1.1500	35.0000	1.02
Road	Passenger Car	Commute	Gasoline	1.1500	35.0000	1.02
Road	Passenger Car	Personal	Gasoline	1.1500	35.0000	1.02
				Save	Close	

Fuel Consumption Factors

- **Congested to Free Flow Consumption per Mile Ratio.** The ratio of fuel per mile consumed in congested conditions to the fuel per mile consumed in free-flow conditions. For example, a value of 2 will cause any driving in congested conditions to expend twice as much fuel.
- **Congested Hour to Congested Mile Ratio.** The ratio of fuel per hour consumed in congested conditions to the fuel per mile consumed. This is the equivalent of the average miles per hour in congested conditions for this mode.
- **Fuel Penalty for Ratio on Poor Pavement.** The ratio of the penalty value to the ordinary value. For example, a value of 2 will cause any driving on poor pavement to expend twice as much fuel. A value of 1 will mean that driving on poor pavement is identical to driving on normal pavement. Fraction of Pavement in Poor Condition can be adjusted on the *Travel* page under the *Other* tab.

Occupancy

Time Value Environmental Fuel Consumption Occupancy Safety Other Cost Logistics						
<div>Cancel Changes</div> <div>All \$ inputs should be entered as constant 2019 Dollars</div>						
Facility	Mode	Purpose	Fuel Type	Avg Crew Members per Veh	Avg Veh Occupancy	Freight US Tons per Veh
Road	All Trucks	Freight	Diesel	1.00	0.000	12.29
Road	Bus Rapid Transit (BRT)	Commute	Diesel	1.00	0.000	0.00
Road	Passenger Car	Business	Gasoline	0.00	1.408	0.00
Road	Passenger Car	Commute	Gasoline	0.00	1.181	0.00
Road	Passenger Car	Personal	Gasoline	0.00	1.906	0.00
				Save	Close	

Occupancy Factors

- **Avg Crew Members per Veh.** Number of crew per vehicle for transit or freight vehicles, or drivers of taxis or TNCs. Drivers of passenger cars are not included in this figure.

- **Avg Veh Occupancy.** Number of non-driver, non-crew passengers per vehicle. Drivers of passenger cars are included in this figure.
- **Freight US Tons per Veh.** Average number of freight US tons per vehicle.

Safety

Facility	Mode	Purpose	Fuel Type	Fatalities per 100m VMT	Injuries per 100m VMT	Crash-Involved Vehicles per 100m VMT	Vehicles per Crash
Road	Light/Medium Duty Truck	Freight	Diesel	0.345	16.52	195.72	1.78
Road	Passenger Car	Business	Gasoline	1.155	130.99	455.99	1.78

Safety Factors

- **Fatalities Per 100m VMT.** Number of expected fatalities per 100 million vehicle miles traveled.
- **Injuries Per 100m VMT.** Number of expected injuries per 100 million miles traveled.
- **Crash-Involved Vehicles Per 100m VMT.** Number of expected crash-involved vehicles per 100 million miles traveled.
- **Vehicles per Crash.** Number of expected vehicles involved in each crash.

Other Costs

Facility	Mode	Purpose	Fuel Type	Vehicle Operating Cost \$/Mile Free Flow	Vehicle Operating Cost \$/Mile Congested	Vehicle Operating Cost \$/Hour Congested or Idle	VOC Penalty Ratio for Poor Pavement	VOC Penalty Ratio	\$ per Fatality	\$ per Injury A	\$ per Injury B	\$ per Injury C
Road	Light/Medium Duty Truck	Freight	Diesel	0.630	0.630	24.330	1.18	0.00	11,800,000.00	564,300.00	153,700.00	76,100.00
Road	Passenger Car	Business	Gasoline	0.186	0.186	5.810	1.21	0.00	11,800,000.00	564,300.00	153,700.00	76,100.00

Other Cost Factors

- **Vehicle Operating Cost (\$/Mile Free Flow, \$/Mile Congested, \$/Hour Congested or Idle).** Cost of operating each vehicle per mile or hour, depending on conditions.
- **VOC Penalty Ratio for Poor Pavement.** Ratio of the penalty value to the ordinary value. For example, a value of 2 will cause any driving on poor pavement to cost twice as much in vehicle operating costs as on normal

pavement. A value of 1 will mean that driving on poor pavement is identical to driving on normal pavement. Fraction of Pavement in Poor Condition can be adjusted on the *Travel* page under the *Other* tab.

- **VOT Penalty Ratio.** Ratio of the penalty value to the ordinary value. For example, a value of 2 will cause any travel time identified or adjustment (entered in Travel Characteristics) to cost twice as much in Value of Time. A value of 1 will mean that driving on poor pavement is identical to driving on normal pavement. Fraction of Pavement in Poor Condition can be adjusted on the *Travel* page under the *Other* tab.
- **\$ Per Fatality.** The social benefit of each averted fatality.
- **\$ Per Injury (A, B, C, O, U).** The social benefit of each averted injury of the severity indicated on the KABCO scale. U means the severity is unknown.
- **\$ Per Crash-Involved Vehicle.** The social benefit of each averted crash-involved vehicle.
- **Other Societal Benefits.** A positive number representing other non-monetary benefits not otherwise represented, such as public health benefits of cycling. These are done on a vehicle-mile basis.
- **Other Societal Costs.** A positive number representing other non-monetary costs not otherwise represented, such as noise. These are done on a vehicle-mile basis.
- **Company Share.** Fractional share of TNC fare that to the company.

Logistics

Cancel Changes All \$ inputs should be entered as constant 2019 Dollars

Facility	Mode	Purpose	Fuel Type	Late Penalty Fraction (Low)	Late Penalty Fraction (Medium)	Late Penalty Fraction (High)	Inventory Cost Multiplier (Low)	Inventory Cost Multiplier (Medium)	Inventory Cost Multiplier (High)	Late Dock Penalty
Road	All Trucks	Freight	Diesel	0.00	0.20	0.20	0.00	25.00	12.50	250.00
Road	Bus Rapid Transit (BRT)	Commute	Diesel							
Road	Passenger Car	Business	Gasoline							
Road	Passenger Car	Commute	Gasoline							
Road	Passenger Car	Personal	Gasoline							

Save Close

Logistics Factors

- **Late Penalty Fraction (Low, Medium, High).** Probability (0 to 1) that a late dock penalty will be assessed for Low, Medium, or High sensitivity goods for every hour of buffer time suggested by the buffer time index calculation.
- **Inventory Cost Multiplier (Low, Medium, High).** Multiple applied to the cost of goods for Low, Medium, or High sensitivity goods in order to estimate the other logistics and supply chain costs of unreliability beyond equipment costs, inventory carrying costs, and dock penalties. These other logistics costs are calibrated to follow NCHRP 824 and 925 but include variation by commodity.
- **Late Dock Penalty.** Average penalty assessed when a shipment arrives late at its destination to cover dock workers' time and other supply chain costs that are incurred at the facility and passed on to the shipper or receiver.

Costs

Users will often want to enter data to reflect one-time construction or improvement costs, as well as on-going costs associated with operations and maintenance of facilities. The *Costs* page is where this data is entered.

In TREDIS, costs are defined for each year selected for either year, region, and facility.

Conceptually, the label "costs" reflects the use of these inputs in the Benefit-Cost Analysis, where the inputs are used in proportion to benefits. Keep in mind, however, that for an Economic Impact Analysis, "costs " are treated as spending that boosts economic activity.

Basic vs. Advanced Views

TREDIS has two views of costs: "Basic" and "Advanced". You can move between the two by using the *Go to Advanced* or *Go to Basic* buttons at the top right of the page.

- **Basic** view prompts you for just two numbers for each region: Total Construction Costs and Annual Oper & Maint Costs. These are appropriate for a sketch analysis or if you do not have detailed information.
- **Advanced** view allows you to enter a detailed breakdown of these numbers among multiple spending categories and all years of construction and operations.

By entering your totals first in the Basic view and then clicking the *Go to Advanced* button, you can see directly how TREDIS distributes the Basic inputs to categories and years.

Facilities

Each mode in TREDIS associated with a facility. The facilities available for input depend on the modes and purposes selected in the *Modes* page. TREDIS differentiates among 4 facility types, defined as follows:

- **Road** facilities are for all passenger cars, trucks, and active modes, including pedestrian and bike.
- **Rail** facilities are for all kinds of train, including passenger and freight, heavy and light.
- **Air** facilities are for all kinds of aircraft, including passenger and freight.
- **Marine** facilities are for all kinds of sea or maritime travel, including passenger ships, small craft, ferries, and freight shipping.

Buttons

At the top right of any view on the *Costs* page, 2 buttons are available.

Either a *Go to Advanced* or *Go to Basic* button will appear to allow you to switch between Basic and Advanced views. If you switch back to Basic view from Advanced, any details you entered in Advanced will be discarded (with a warning before TREDIS does this).

The *Save* button saves any changes in the current grid you are viewing. The *Save* button will change color to remind you to click it if you make any changes, and colored ticks on the boxes indicate values that have changed since the last save.

There are some alternate ways to enter or affect costs in TREDIS that can be accessed using the buttons at the bottom of the *Costs* page. Click the links below for details.

- The [Cost & Revenue Sharing](#) button opens a window to allocate costs and revenue between public and/or private entities.
- The [Useful Life Settings](#) button opens a window to change the useful life span of facilities for your project.
- The [Quantities and Unit Costs](#) button opens the a window to enter costs in an alternate format.

Using the Basic View

The Basic Costs View is useful for entering only a few numbers when only totals are available for cost estimation.

Go To Advanced

Save

Cancel Changes		All inputs should be entered as constant 2019 \$M				
Alternative	Region	Cost Type	Road	Rail	Air	Marine
Base	Eastern Area	Total Construction Costs		0.00		
Base	Eastern Area	Annual Oper & Maint Costs		1.00		
Base	Western Area	Total Construction Costs		0.00		
Base	Western Area	Annual Oper & Maint Costs		1.00		
Project	Eastern Area	Total Construction Costs		100.00		
Project	Eastern Area	Annual Oper & Maint Costs		1.50		
Project	Western Area	Total Construction Costs		150.00		
Project	Western Area	Annual Oper & Maint Costs		2.50		

Cost & Revenue Sharing

Useful Life Settings

Basic Costs View

- **Total Construction Costs.** Each line for Total Construction Costs indicates the cost of the entire project’s investment, to be spread across all construction years (as designated in the *Timing* page). The entire sum of the project investment (within the region and facility) is expressed in a single sum and represents a one-time total.
- **Annual Oper & Maint Costs.** Each line for indicates costs that recur annually, whether for maintaining infrastructure, operating services, or other. These recur over every year in the Operations Years defined in the *Timing* page.

TREDIS allows entries for Road, Rail, Air, and Marine facilities, showing only those that are applicable to the modes selected on the *Modes* screen.

All inputs are in millions in the constant dollar year of the project.

The following figure shows the Basic view on the *Costs* page for a project that is Facility Based and has two regions defined. Only rail modes were selected on the *Modes* page, so only the Rail facility is editable. Notice there is no explicit External region.

Using the Advanced View

The Advanced Costs View allows you to enter detailed costs broken down for each spending category. In addition to expanding the spending categories, it allows you to enter costs by year.

Go To Basic Save

Cancel Changes														
All inputs should be entered as constant 2019 \$M														
Alternative	Region	Facility	Year	Spending in Construction Years							Spending in Operations Years			
				Property Acquisition	Engineering And Design	Right Of Way	Transport Structures	Terminal	Vehicles	Technology	Operations and Services	Freight Rail	Passenger Rail	Infrastructure Maintenance
Base	Eastern Area	Road	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Base	Eastern Area	Road	2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
Base	Eastern Area	Road	2022								0.00			0.00
Base	Eastern Area	Rail	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Base	Eastern Area	Rail	2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Base	Eastern Area	Rail	2022									0.00	0.00	0.00

Advanced Costs View

Similarly to the Basic view, the Advanced view will include an External region for projects that are O-D Based, but will not include one for Facility Based projects.

Notice that the Spending in Construction Years are available to input for every year of your Construction, and the Spending in Operations Years are available for input for every year of Operations, both set on the *Timing* page.

If there are many rows of inputs, you may want to filter using the controls on the header row.

Capital Costs

Capital costs are typically for long-term investments made on a one-time basis. The years that capital costs are entered are the years chosen as Construction Years on the *Timing* page. The categories are defined as follows:

- **Property Acquisition.** Right-of-way purchases or easements.
- **Engineering and Design.** Soft costs of construction, including planning, analysis, legal, architectural, engineering, and design work.
- **Right of Way.** Earthmoving, grading, drainage, and paving. For railroads, this includes all expenditures on the laying of rails; for airports, this includes runway construction.
- **Transport Structures.** Construction of culverts, road bridges, flyovers, railroad bridges, and marine docks.
- **Terminal.** Operations offices, maintenance facilities, airport/bus/rail terminals, and storage buildings.
- **Vehicles.** Acquisition of rail cars and engines, ferries, airplanes, barges, or maintenance or service vehicles.
- **Technology.** Intelligent transportation systems (ITS), communications equipment, electric vehicle infrastructure.

Operational Costs

Operational costs are recurring costs expended on an annual or periodic basis. The years that operational costs are entered are the years chosen as Operational Years on the *Timing* page. The categories are defined as follows:

- **Operations and Services.** For Road, Air, and Marine, operations costs for highway toll collection, systems operation, or incident management.
- **Passenger Rail.** Costs for operations for Passenger Rail, including systems operation, or incident management.
- **Freight Rail.** Costs for operations for Freight Rail, including systems operation, or incident management.
- **Infrastructure and Rehabilitation.** Crack repair, repaving, or vegetation control; also includes vehicle servicing.

Cost and Revenue Sharing

The *Cost and Revenue Sharing* screen allows you to specify how project costs and revenue are distributed between public and private agencies or organizations. For each type of project cost or revenue, the table shows the derived amount (if applicable), then provides input variables to assign the share of the value on a fractional basis, between the public sector and the private sector.

Project Costs

- **Capital Costs (\$m total for Construction Period).** Amount shown is derived from the Start-up Cost Component input table.
- **Operations Costs (\$m/yr for Operations Period).** Amount shown is derived from the Annual Cost Components input table.
- **Maintenance Costs (\$m/yr for Operations Period).** Amount shown is derived from the Annual Cost Components input table.
- **Lease/Contract Costs (\$m/yr for Operations Period).** Cost incurred by the public or private agency to run the facility (the amount should be entered alongside the fractions public and private).

Project Revenues

- **Toll Revenues (\$m for Analysis Year).** Revenue amount is derived from the Require Inputs table.
- **Lease/Contract Revenues (\$m/yr for Operations Period).** Revenue amount should be entered alongside the fraction public and private.

Note: All values should be in terms of millions of dollars (or local currency), leaving out the currency symbol.

Alternative	Capital Costs \$m total for Construction Period		Operations Costs \$m total for Operations Period		Maintenance Costs \$m total for Operations Period		Toll Revenues \$m for Analysis Period		Lease/Contract Costs m/yr for Operations Period		Lease/Contract Revenues m/yr for Operations Period	
	Fraction Public	Fraction Private	Fraction Public	Fraction Private	Fraction Public	Fraction Private	Fraction Public	Fraction Private	Fraction Public	Fraction Private	Fraction Public	Fraction Private
Base	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000
Bus Rapid Transit	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000

Revenue and Cost Sharing

Note that, as with cost tables, inputs for the cost and revenue sharing table are specified for all Alternatives, including no-build). The ultimate metrics (return on investment, payback period) are based on the net differences between costs and revenues for the build vs. no-build Alternatives.

You can export the basic costs table to a spreadsheet and use the cut/copy/and paste functions to aid in your data entry.

Useful Life Settings

The *Useful Life Settings* window lets you change the average lifespan in years for various elements for the four main facilities used by TREDIS:

- **Right of Way.** Life of roads, rail beds, runways, etc.
- **Transport Structures.** Life of bridges and tunnels and similar
- **Buildings and Equipment.** Life of buildings and equipment, including terminals and warehouses
- **Vehicles.** Life of vehicles, including trucks, cars, trains, buses, aircraft, etc.

Enter the new values and press the *Save* button to update.

Cancel Changes

Facility	Right of Way	Transport Structures	Buildings and Equipment	Vehicles
Road	20	30	40	15
Rail	15	40	40	25
Water	40	40	40	30
Air	30	40	50	20

Save

Close

?

The Useful Life Settings Window

Quantities and Unit Costs

The *Quantities and Unit Costs* window allows an alternate way to enter capital costs for Construction Years. Once these are entered, if any costs or units are not zero, all capital costs in Construction Year are taken from this window.

Cancel Changes

All unit costs should be entered as constant 2021 \$M

Alternative	Region	Facility	Improvement Type	Units	Unit Cost
Base	Region 1	Road	Miles	1	10,000
Base	Region 1	Road	Bike/Ped/Access Miles	1	2,000
Base	Region 1	Road	Intersections/Crossings	1	9,000
Base	Region 1	Road	Bridges	1	201,000
Base	Region 1	Road	Transit Stations/Stops	1	0.500
Base	Region 1	Road	Other Facilities	1	1,000
Base	Region 1	Road	Vehicles	1	0.100
Project	Region 1	Road	Miles	2	10,000
Project	Region 1	Road	Bike/Ped/Access Miles	3	2,000
Project	Region 1	Road	Intersections/Crossings	4	9,000
Project	Region 1	Road	Bridges	1	201,000
Project	Region 1	Road	Transit Stations/Stops	19	0.500
Project	Region 1	Road	Other Facilities	2	1,000
Project	Region 1	Road	Vehicles	1	0.100

Clear All Unit Costs

Save

Close

The Quantities and Unit Costs Window

Once entered, total costs are distributed to appropriate categories across all construction years, and on the primary Costs page, the appropriate cells are greyed out (indicating they can't be manually edited) and a notice at the top left indicates that Quantities and Unit Costs are being used for Construction capital costs.

Spending in Construction Years are based on Quantities and Unit Costs.

Go To Basic

Save

Cancel Changes		All inputs should be entered as constant 2021 \$M												
Alt. :	Region :	Facility :	Year :	Spending in Construction Years							Spending in Operations Years			
				Property Acquisition	Engineering and Design	Right Of Way	Transport Structures	Terminal	Vehicles	Technology	Operations and Services	Freight Rail	Passenger Rail	Infrastructure Maintenance
Base	Default Region	Road	2027	7.40	10.90	14.75	40.95	0.50	0.03	0.00	0.00			0.00
Base	Default Region	Road	2028	7.40	10.90	14.75	40.95	0.50	0.03	0.00	0.00			0.00
Base	Default Region	Road	2029	7.40	10.90	14.75	40.95	0.50	0.03	0.00	0.00			0.00
Project	Default Region	Road	2027	8.77	12.72	22.98	43.20	5.83	0.03	0.00	0.00			0.00
Project	Default Region	Road	2028	8.77	12.72	22.98	43.20	5.83	0.03	0.00	0.00			0.00
Project	Default Region	Road	2029	8.77	12.72	22.98	43.20	5.83	0.03	0.00	0.00			0.00

The Basic Costs Page with Data Entered in Quantities and Unit Costs Window

You can revert to manual entry by returning to the *Quantities and Unit Costs* window and clicking the *Clear All Unit Costs* button.

Travel

The *Travel* page is where you enter data reflecting travel. This is an extensive page with multiple subtabs and buttons available to capture all the ways that travel can change between Base and Project alternatives. This page gives an overview of the primary use and functionality, while stand-alone help pages cover individual tabs and buttons.

For details on specific tabs and buttons, see the [Tabs on the Travel Page](#) or [Buttons on the Travel Page](#) subsections for listings for all tabs and buttons.

Travel Data Entry and Tabs

The primary means for entering travel data in TREDIS is via a series of tabs, each of which has a data entry grid. Data can be manually typed, or it can be copy-pasted into the grid as if it were an Excel sheet. (If you do this, be careful, since you may be pasting into grayed out areas or outside of the grid.)

For Facility Based Projects, each row of data is defined by the *Alternative*, *Region*, *Segment*, *Mode*, and *Purpose* of the row, so the data entered only refer to that subset of travel. The rows where the *Alternative* is "Base" represent together the annual travel in the Base Alternative for the given Data Year (indicated on the upper right next to the *Data Year* control) – and the rows where *Alternative* is "Project" represent the annual travel in the Project alternative.

The screenshot shows the TREDIS Travel page interface. At the top, there are tabs: PROJECT, TIMING, REGIONS, MODES, COSTS, TRAVEL (selected), ACCESS, and RESULTS. Below the tabs, there are controls for Congestion-Reliability Input Method (Both, Fraction Congested, Buffer Time Index) and buttons for Diagnostics and Save. A Data Year dropdown is set to 2031. Below this, there are subtabs: Required Inputs (selected), Occupancy, Congestion, Flow, Fuel, Charges, Fees, Tolls, Safety, and Other. The main data input grid is displayed, showing data for the year 2031. The grid has columns for Alternative, Region, Segment, Mode, Purpose, Period Veh-Trips, Period VMT, Period VHT, Transit Passenger Trips, Transit Passenger Miles, Transit Passenger Hours, and Out of Vehicle Passenger Time. The 'Base' and 'Project' rows are highlighted with red boxes.

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Boston Area	Annual	Passenger Car	Business	100,000	10,000,000	50,000				
Base	Cape and Islands	Annual	Passenger Car	Business	100,000	10,000,000	50,000				
Base	Western Mass	Annual	Passenger Car	Business	100,000	10,000,000	50,000				
Project	Boston Area	Annual	Passenger Car	Business	100,000	10,100,000	45,000				
Project	Cape and Islands	Annual	Passenger Car	Business	100,000	10,100,000	45,000				
Project	Western Mass	Annual	Passenger Car	Business	100,000	10,100,000	45,000				

Travel Page with Data Input Grid Highlighted

For O-D Based Projects, the same is true, except *Region* is replaced by two fields: *From Region* (the origin region) and *To Region* (the destination region).

The primary data needed are entered on the *Required Inputs* tab. In TREDIS, economic benefits and impacts of the project are typically driven by differences in the Base and Project alternatives for metrics, especially those on the *Required Inputs* tab. As in the two rows above, the *Region*, *Segment*, *Mode* and *Purpose* columns all match values, but differ only by the *Alternative*. The differences in the *Period VMT* and *Period VHT* columns in those rows will often drive changes in the results, though this depends on the changes being modeled between Base and Project alternatives.

For private modes these data are primarily vehicle trips, vehicle miles traveled (VMT), and vehicle hours traveled (VHT). For transit vehicles and passenger aviation, these are passenger trips, passenger miles traveled (PMT), and passenger hours traveled (PHT) (though vehicle trips, miles, and hours can be entered for these other modes as well).

Other tabs are optional, but the same principle applies: Differences between the Base row and Project row for any combination of *Period*, *Segment*, *Mode* and *Purpose* reflect differences in the Base and Project alternatives. Data on other tabs may not be needed for your project if metrics are not expected to change or no localization is needed. See the [Default Factors and Data Sources](#) document for information on TREDIS defaults for many of these measures.

Note: For each analysis you do that is Facility Based, consider carefully the *Flow* tab. Lacking any project-specific information, the defaults for a new project assume all travel is within a region. This will not always be appropriate and leaving the defaults may result in overestimation of economic impacts for the region of interest. This is because any benefits for a trip that is 100% internal to the region are counted entirely for the region, whereas trips leaving or entering the region count for 50%, and through trips do not count at all for many purposes. This means it is easy to overestimate economic impacts if there is significant incoming, outgoing, or through traffic that is not accounted for on the *Flow* tab. For a BCA, the Region where benefits are enjoyed may not matter for the analysis, though if you are intending to differentiate benefits by Region it will make a difference.

Another condition to consider is if there are more passenger or freight-ton trips in the Project Alternative than the Base Alternative in a given year. This indicates induced travel, and you should be aware of this and consider whether you will be accounting for the additional trips as induced. To do so, click the [Trip Balancing](#) button, which will automatically turn red if unbalanced trips are saved.

Travel Data Across Years

When first visiting the *Travel* page, the first Operations year is selected in the *Data Year* dropdown and the corresponding data is shown in the data entry matrix. In the years listed left-to-right, any year with data entered is in bold font. (The default is to consider this first Operations year as having been entered, since at least one year of data is needed for a TREDIS project.)

To delete entries for an entire year, select that year in the dropdown menu and then press the X icon to the right of the *Data Year* dropdown.

TREDIS will interpolate and extrapolate travel data for any years not entered. See the section describing the [Results Settings](#) page for more information on choosing the interpolation method.

PROJECT TIMING REGIONS MODES COSTS TRAVEL ACCESS RESULTS

Congestion-Reliability Input Method ☒ Both ☐ Fraction Congested ☐ Buffer Time Index

Diagnosics Save

Data Year 2031 2032 2033 2034 2035

Required Inputs Occupancy Congestion Flow Fuel Charges, Fees, Tolls Safety Other

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	Annual	Passenger Car	Business	101,875	1,021,806	40,872				
Base	Metro Region	Annual	Passenger Car	Commute	103,470	1,037,804	41,512				
Base	Metro Region	Annual	Passenger Car	Personal	103,260	1,035,698	41,428				

Travel Page with Data Year Controls Highlighted

Facility-Based vs. O-D Based Projects

In the [Project](#) page, when a project is first created, its *Travel Analysis Type* can be set to be "Facility Based" or "O-D Based". In Facility Based projects, all fields on the tabs in the *Travel page* are entered by Region, starting with the required inputs such as vehicle trips, miles, and hours of travel. The proportions that are internal, incoming, outgoing, and through are indicated on the *Flow* tab. In the figure, travel is entered for each region.

Congestion-Reliability Input Method ☒ Both ☐ Fraction Congested ☐ Buffer Time Index

Diagnosics Save

Data Year 2031 2032 2033 2034 2035

Required Inputs Occupancy Congestion Flow Fuel Charges, Fees, Tolls Safety Other

2031 2032 2033 2034 2035

Cancel Changes

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	Annual	Passenger Car	Business	101,875	1,021,806	40,872				
Base	Metro Region	Annual	Passenger Car	Commute	103,470	1,037,804	41,512				
Base	Metro Region	Annual	Passenger Car	Personal	103,260	1,035,698	41,428				
Base	Metro Region	Annual	Passenger Bus	Commute	107,970	1,082,939	43,318	5,398,500	54,146,955	2,165,878	269,925
Base	Metro Region	Annual	Passenger Bus	Personal	105,290	1,056,059	42,242	5,264,500	52,802,935	2,112,117	263,225
Base	Metro Region	Annual	Tractor-Trailer Truck	Freight	10,415	104,462	4,178				

Required Inputs for Facility Based Project

In contrast, in O-D Based projects, all fields on the tabs in the *Travel* page, including data on trips, miles and hours of travel, are entered on rows where each row is a combination of Regions, with a separate row for each combination of *From Region* and *To Region*. "External" in this case is counted as a Region in addition to any Regions defined on earlier on the Regions page.

Congestion-Reliability Input Method ☒ Both ☐ Fraction Congested ☐ Buffer Time Index

DiagnosticsSave

Data Year 2031

Required InputsOccupancyCongestionFlowFuelCharges, Fees, TollsSafetyOther

20312032203320342035

Cancel Changes

Alternative	From Region	To Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	External	Annual	Passenger Car	Personal	17,554	176,069	7,043				
Base	Metro Region	External	Annual	Passenger Bus	Commute	18,355	184,100	7,364	917,745	9,204,982	368,199	45,887
Base	Metro Region	External	Annual	Passenger Bus	Personal	17,899	179,530	7,181	894,965	8,976,499	359,060	44,748
Base	Metro Region	External	Annual	Tractor Trailer Truck	Freight	1,771	17,759	710				
Base	Metro Region	Metro Region	Annual	Passenger Car	Business	101,875	1,023,844	40,954				
Base	Metro Region	Metro Region	Annual	Passenger Car	Commute	103,470	1,039,874	41,595				

Required Inputs for O-D Based Project

Tabs on the Travel Page

The tabs running across the band navigate between sections for entering data.

The screenshot shows the 'TRAVEL' tab selected in a navigation bar. Below the navigation bar, there are input fields for 'Congestion-Reliability Input Method' (set to 'Both') and 'Data Year' (set to '2031'). A row of tabs is highlighted with a red box, including 'Required Inputs', 'Occupancy', 'Congestion', 'Flow', 'Fuel', 'Charges, Fees, Tolls', 'Safety', and 'Other'. Below the tabs is a table with the following data:

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	Annual	Passenger Car	Business	101,875	1,021,806	40,872				
Base	Metro Region	Annual	Passenger Car	Commute	103,470	1,037,804	41,512				
Base	Metro Region	Annual	Passenger Car	Personal	103,260	1,035,698	41,428				
Base	Metro Region	Annual	Passenger Bus	Commute	107,970	1,082,939	43,318	5,398,500	54,146,955	2,165,878	269,925

The Travel Page with Tabs Highlighted

Click on any of the grey tab names below to jump to the appropriate section. The *Congestion-Reliability Input Method* controls in the upper left of the figure above are used in conjunction with the [Congestion](#) tab – see that section for details.

- [Required Inputs](#). Enter the number of vehicle trips, vehicle miles traveled, and vehicle hours traveled; enter the same metrics for passengers for modes where this is available.
- [Occupancy](#). View or change the number of passengers, crew, and freight tons per vehicle.
- [Congestion](#). Adjust the trip congestion parameters.
- [Flow](#). Specify the fraction of trips within, incoming, outgoing or through the region.
- [Fuel](#). View or change fuel costs and fuel efficiencies.
- [Charges, Fees, Tolls](#). View or change fees and toll charges per vehicle or passenger.
- [Safety](#). View or change crash rates and adjustments.
- [Other](#). View or change other rates relevant to travel.

Required Inputs

The *Required Inputs* tab is used to identify the number of vehicle (and in the case of transit modes, passenger) trips, distance traveled, and hours traveled.

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	Annual	Passenger Car	Business	101,875	1,021,806	40,872				
Base	Metro Region	Annual	Passenger Car	Commute	103,470	1,037,804	41,512				
Base	Metro Region	Annual	Passenger Car	Personal	103,260	1,035,698	41,428				
Base	Metro Region	Annual	Passenger Bus	Commute	107,970	1,082,939	43,318	5,398,500	54,146,955	2,165,878	269,925
Base	Metro Region	Annual	Passenger Bus	Personal	105,290	1,056,059	42,242	5,264,500	52,802,935	2,112,117	263,225

The Required Inputs Tab

Data Fields

- **Period Veh-Trips.** The annual number of vehicle trips.
- **Period VMT.** The annual vehicle distance traveled, in miles.
- **Period VHT.** The annual vehicle travel, in hours, not including buffer time.
- **Transit Passenger Trips.** Total annual passenger trips that is, the sum of all passenger trips.
- **Transit Passenger Miles.** Total annual passenger distance traveled, in miles.
- **Transit Passenger Hours.** Total annual passenger hours traveled.
- **Out of Vehicle Passenger Time.** Total annual passenger hours spent to wait or connect.

Considerations

Depending on the travel modeling inputs you are translating to TREDIS inputs, you may need to convert from a daily figure to the annual figure required by TREDIS. For example, you may need convert "average weekday" values to annual values, possibly by multiplying them by 260 (52 weeks x 5 days/week). Consult the travel demand model specifications for details on what outputs represent in order to convert accurately. If multiple Segments are included and represent periods on a single day, make sure to annualize them all.

Transit modes and aviation modes allow you to enter passenger trips, miles, hours, and out-of-vehicle time directly. For all others, TREDIS will calculate these using vehicle metrics by multiplying by the occupancy rates. (For Freight purposes, this means vehicle metrics are multiplied by average freight tons in US tons). All occupancy rates are entered on the [Occupancy](#) tab.

Conversely, for transit and aviation modes, the occupancy rate is not entered but is can be found directly by dividing the passenger metric by the vehicle metric. Note that this may not be the same for trips, miles, and hours depending on the passenger usage profile.

Effects of Changes in Required Inputs

While projects may be complicated and many metrics may change between Base and Project alternatives, it can be useful to remember some basic relationships that will drive changes in costs, since cost changes ultimately impact all categories of results.

- Changes in vehicle or passenger trips will drive changes in per-trip charges or fees. This means that for many cases, changes in trips will not by themselves greatly change cost. However, a change in trips can indicate that you will need to indicate to TREDIS what share are induced trips. See documentation on [Trip Balancing](#) for more.
- Changes in VMT between Base and Project alternatives will drive changes in crash incidence, vehicle operating costs, fuel costs, and environmental costs.
- Changes in passenger hours traveled (either directly or via changes in VHT) will drive changes in passenger time cost and crew time cost.
- Changes in VHT for freight purposes will drive changes in freight logistics delay costs.

Occupancy

The *Occupancy* tab allows you to view and/or change the number of crew and passengers per vehicle as well as the freight capacities of modes that carry freight.

In the case of transit modes (bus and passenger rail for example), the average passenger occupancy rates are calculated from the values entered in the *Required Inputs* tab for vehicles and passengers, and may not be changed here. All values are initially set to the default values.

Note that you may only enter or update the values in those fields that are not gray.

PROJECT
TIMING
REGIONS
MODES
COSTS
TRAVEL
ACCESS
RESULTS

Congestion-Reliability Input Method
☒ Both
☐ Fraction Congested
☐ Buffer Time Index

Diagnostics
Save

Data Year
2031
Required Inputs
Occupancy
Congestion
Flow
Fuel
Charges, Fees, Tolls
Safety
Other

2031 2032 2033 2034 2035

Cancel Changes

Alternative	Region	Segment	Mode	Purpose	Avg Crew Members per Veh	Avg Veh Occupancy	Freight US Tons per Veh
Base	Metro Region	Annual	Passenger Car	Business	0.00	1.111	
Base	Metro Region	Annual	Passenger Car	Commute	0.00	1.082	
Base	Metro Region	Annual	Passenger Car	Personal	0.00	1.794	
Base	Metro Region	Annual	Passenger Bus	Commute	1.00		
Base	Metro Region	Annual	Passenger Bus	Personal	1.00		
Base	Metro Region	Annual	Tractor Trailer Truck	Freight	1.00		17.50
Project	Metro Region	Annual	Passenger Car	Business	0.00	1.111	

The Occupancy Tab

Data Fields

- Avg Crew Members per Veh.** The average number of crew members per vehicle per trip. This has a default set at the mode-purpose level but can be changed by the user.
- Avg Vehicle Occupancy.** The average number of passengers (including the driver) per trip. For transit modes, such as passenger bus or rail, the value is calculated from the values on the *Required Inputs* tab as the ratio of Transit Passenger Trips/Period Veh-Trips. For freight modes, the field is not applicable and grayed out.
- Freight US Tons per Veh.** The average number of US tons per vehicle per trip. This may be in a different unit if you are not using TREDIS in the US. For non-freight carrying modes, the field is not applicable and grayed out.

Congestion

In TREDIS, the fraction congested is used to estimate how much vehicles are subject to extra costs from travelling in congested conditions, such as operating costs (e.g., wear-and-tear on brakes) and reduced fuel efficiency (from start-and-stop conditions). The concept of buffer time is used to represent time that is added to trips to account for unreliability. Unreliable travel times cause travelers to make early departures to buffer against potential delay. In TREDIS, buffer time represents the extra scheduling time in hours that ensures on-time arrivals for 95% of the trips.

Changes in congestion between your Base and Project alternatives will affect vehicle fuel efficiency. Changes in reliability (via buffer hours) affects time savings (both for private and crew travel), and freight logistics.

The metrics on the *Congestion* tab work in conjunction with the *Congestion-Reliability Input Method* control at the top of the *Travel* page.

Note that these variables and related factors are only used and calculated for private vehicles that use the Road facility.

Choosing the Congestion-Reliability Input Method

The *Congestion-Reliability Input Method* control has radio buttons and a dropdown, as shown in the figure below.

Use the radio buttons to select *Both*, *Fraction Congested*, or a reliability metric. Selecting the radio button next to *Fraction Congested* means you will enter only fraction congested. Selecting the radio button next to the reliability metric means you will only enter the reliability metric selected via the dropdown. Selecting *Both* means you will directly provide both.

The screenshot shows the 'TRAVEL' tab in the TREDIS interface. At the top, there are tabs for PROJECT, TIMING, REGIONS, MODES, COSTS, TRAVEL (selected), ACCESS, and RESULTS. Below these tabs is the 'Congestion-Reliability Input Method' control. It features three radio buttons: 'Both' (selected), 'Fraction Congested', and 'Buffer Time Index'. A dropdown menu is open next to the 'Buffer Time Index' radio button, showing three options: 'Buffer Hours per Trip', 'Required Buffer Time Index', and 'Total Buffer Hours'. Below the control is a table with columns for Alternative, Region, Segment, Mode, Purpose, Period Veh-Trips, Period VMT, Period VHT, Transit Passenger Trips, Transit Passenger Miles, Transit Passenger Hours, and Out of Vehicle Passenger Time. The table contains data for Base and Project alternatives across different regions and modes.

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Default Region	Annual	Passenger Car	Business	0	0	0				
Base	Default Region	Annual	Passenger Car	Commute	0	0	0				
Base	Default Region	Annual	Passenger Car	Personal	0	0	0				
Base	Default Region	Annual	Tractor Trailer Truck	Freight	0	0	0				
Project	Default Region	Annual	Passenger Car	Business	0	0	0				
Project	Default Region	Annual	Passenger Car	Commute	0	0	0				
Project	Default Region	Annual	Passenger Car	Personal	0	0	0				
Project	Default Region	Annual	Tractor Trailer Truck	Freight	0	0	0				

The Travel Page with Congestion-Reliability Preferences

In practical terms, this means that if you choose *Fraction Congested* here as the *Congestion-Reliability Input Method*, you will only be able to enter data in the *Fraction Congested* column in the matrix below, and the buffer hours that travelers add to their trips will be estimated based on the congestion. Likewise, if you select the third radio button and select *Total Buffer Hours*, TREDIS will only allow data entry in that column, and will later impute the fraction congested when performing the analysis. This option can be seen in the figure below.

2023

Alternative	Region	Segment	Mode	Purpose	Fraction Congested	Buffer Hours per Trip	Buffer Time Index	Total Buffer Hours
Base	Default Region	Annual	Passenger Car	Business				1,032,132
Base	Default Region	Annual	Passenger Car	Commute				2,321,321
Base	Default Region	Annual	Passenger Car	Personal				32,132
Base	Default Region	Annual	Tractor Trailer Truck	Freight				32,323,132
Project	Default Region	Annual	Passenger Car	Business				932,645
Project	Default Region	Annual	Passenger Car	Commute				1,354,866
Project	Default Region	Annual	Passenger Car	Personal				28,111
Project	Default Region	Annual	Tractor Trailer Truck	Freight				29,456,460

The Congestion Tab with Total Buffer Hours Chosen

Finally, selecting Both will mean TREDIS expects you to enter both the Fraction Congested and whichever reliability metric is selected. Anything not entered will be 0 by default.

After changing the *Congestion-Reliability Input Method*, the variables you can no longer enter will be greyed out in the entry matrix, the Save button will toggle to red to indicate there are unsaved changes. When you click Save, the stored values for the variable being imputed will be calculated based on your preferred variable, overwriting any previous values input when your preferences were set to Both.

When switching between reliability metrics, TREDIS automatically recalculates the appropriate values to be the equivalent of any data already entered.

Data Fields

- Fraction Congested.** The fraction of all travel subject to congestion. For highway modes, it should be calculated as the fraction of VMT subject to a volume capacity greater than 0.9. The value represents a fraction, not a percent, so values must lie between 0 (no congestion) and 1 (pervasive congestion). Entering 0.3500 is valid, whereas entering 35 or 35% is not.
- Buffer Hours per Trip.** The number of hours of extra scheduling time needed to ensure on-time arrivals for 95% of the trips. For example, if a sample trip takes 30 minutes on average, but 1 out of every 20 days it takes 45 minutes, then the buffer time is 0.25 hours (or 15 minutes). This supports fractions of hours.
- Buffer Time Index.** The Total Buffer Hours as a fraction of total VHT. As an equation, *Buffer Time Index* = *Total Buffer Hours* / *Vehicle Hours Traveled*.
- Total Buffer Hours.** The total number of vehicle hours added as buffer. As an equation, *Total Buffer Hours* = *Buffer Hours per Trip* * *Vehicle Trips*.

Flow

For Facility-Based projects, the data inputs in the *Flow* tab indicate the fractional share of travel – measured by fraction of trips – taking place within, going out of, going into, or passing through the Region of the data row.

For O-D Based projects, all the columns in this tab will be grayed out, as they are not valid.

Data Fields

All fields are to be entered as fractions, and thus must be entered as a number from 0 to 1.

- **Internal Trips** begin and end within the Region. All of their traveler benefits and all of the economic impacts are within the Region.
- **Incoming Trips** originate outside the Region but end within it. Half of their traveler benefits and economic impacts are within the Region.
- **Outgoing Trips** originate within the Region but end externally. Half of their traveler benefits and economic impacts are within the Region.
- **Through Trips** have both their origin and destinations outside the Region, so that vehicles pass through the region (and use the travel facility) but do not stop there. None of their traveler benefits or economic impacts are within the Region.

In addition to determining where benefits and impacts are felt, for freight modes, the flow shares are used to match commodity costs to industries based on whether the commodities are being imported or exported. Incoming freight trips are matched to industries that use the commodities being shipped, whereas outgoing trips are matched to industries that produce the commodities being shipped. Internal trips are split between users and producers).

If the sum of the 4 shares in a row does not equal exactly 1.0000, you will get an error when you click *Save* and your changes will be lost for any rows where they don't sum correctly.

Example

Consider the following example.

PROJECTTIMINGREGIONSMODESCOSTSTRAVELACCESSRESULTS

Congestion-Reliability Input Method ☒ Both ☐ Fraction Congested ☐ Buffer Time Index

DiagnosticsSave

Data Year 2030

Required InputsOccupancyCongestionFlowFuelCharges, Fees, TollsSafetyOther

2030

Cancel Changes

Alternative	Region	Segment	Mode	Purpose	Fraction of Trips Internal	Fraction of Trips Incoming	Fraction of Trips Outgoing	Fraction of Trips Through
Base	Boston Region	Annual	Passenger Car	Business	0.5000	0.2000	0.2000	0.1000
Base	Rest of State	Annual	Passenger Car	Business	1.0000	0.0000	0.0000	0.0000
Project	Boston Region	Annual	Passenger Car	Business	0.5000	0.2000	0.2000	0.1000
Project	Rest of State	Annual	Passenger Car	Business	1.0000	0.0000	0.0000	0.0000

Example Inputs on the Flow Tab

The entered data for Passenger Car mean the following:

- 50% of trips take place within the Boston Region.
- 20% of trips end in Boston Region but originated externally.
- 20% of trips start in Boston Region but end externally.
- 10% of trips pass through Boston Region and don't stop.

Fuel

TREDIS includes federal and state fuel tax rates for various fuel types (gasoline, diesel, etc.) which may be overwritten as needed. Additionally, fuel efficiency can be changed.

Congestion-Reliability Input Method ☒ Both ☐ Fraction Congested ☐ Buffer Time Index

Data Year

Required Inputs: Occupancy Congestion Flow **Fuel** Charges, Fees, Tolls Safety Other

2031 2032 2033 2034 2035

Cancel Changes All inputs should be entered as constant 2023 \$M

Alternative	Region	Segment	Mode	Purpose	Fuel Type	Fuel Cost w/Taxes	Federal Fuel Tax	State Fuel Tax	Fuel Per Mile
Base	Metro Region	Annual	Passenger Car	Business	Gasoline	2.95	0.18	0.27	0.0443
Base	Metro Region	Annual	Passenger Car	Commute	Gasoline	2.95	0.18	0.27	0.0443
Base	Metro Region	Annual	Passenger Car	Personal	Gasoline	2.95	0.18	0.27	0.0443
Base	Metro Region	Annual	Passenger Bus	Commute	Diesel	3.72	0.24	0.27	0.2395
Base	Metro Region	Annual	Passenger Bus	Personal	Diesel	3.72	0.24	0.27	0.2395

The Fuel Tab

Data Fields

All monetary units are fractions of a whole dollar, so that a quantity of 50 cents would be entered as 0.5000 for example. The dollar year is the dollar year of the Contract.

- **Fuel Type.** One of the following: Gasoline, Diesel, Electric, Aviation Fuel, Marine Fuel, or None. This field cannot be changed but shows the relevant fuel type for subsequent fields.
- **Fuel Cost.** The total cost in dollars per unit of fuel. This field is prepopulated with the cost for the fuel type shown, depending on the state. It includes both state and federal fuel taxes, which are shown in their respective columns in this table. The user may change fuel costs, but if the cost changes are due to changes in federal or state fuel taxes, then those values also need to be adjusted.
- **Federal Fuel Tax.** The federal fuel tax per unit of fuel. The federal fuel tax is default to the current tax per gallon (or other unit of measure as appropriate for your country) and may be changed as desired. Defaults are provided for the different Fuel Types.
- **State Fuel Tax.** The state fuel tax per unit of fuel. In a similar manner to federal fuel tax, this field allows you to override the state fuel tax rates.
- **Fuel Per Mile.** Units of fuel used per mile.
- **Well-to-Pump CO2 (lbs).** For each unit of fuel used, the number of pounds of CO2 produced to get the fuel to the point of delivery.
- **Tailpipe CO2 (lbs).** For each unit of fuel used, the number of pounds of CO2 produced by the vehicle directly (as opposed to the well-to-pump cycle).

Fuel Types and Units

- **Gasoline** is measured in gallons.
- **Diesel** is measured in gallons.

- **Electric** fuel is measured in kilowatt hours (kWh).
- **Aviation** fuel is measured in gallons.
- **Marine** fuel is measured in gallons.
- **CCG** is measured in Gallons of Gasoline Equivalent (GGE).

Charges, Fees, Tolls

This tab is used to view and change various fees, taxes, and tolls on an average per vehicle basis.

PROJECT
TIMING
REGIONS
MODES
COSTS
TRAVEL
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RESULTS

Congestion-Reliability Input Method
☒ Both
☐ Fraction Congested
☐ Buffer Time Index

Data Year
2031

Required Inputs
Occupancy
Congestion
Flow
Fuel
Charges, Fees, Tolls
Safety
Other

2031 2032 2033 2034 2035

Cancel Changes
All inputs should be entered as constant 2023 \$M

Alternative	Region	Segment	Mode	Purpose	Charge per Veh Mile	Charge per Veh Trip	Charge per Pass Trip	Charge per Pass Mile
Base	Metro Region	Annual	Passenger Car	Business	0.000	0.000	0.000	
Base	Metro Region	Annual	Passenger Car	Commute	0.000	0.000	0.000	
Base	Metro Region	Annual	Passenger Car	Personal	0.000	0.000	0.000	

The Charges, Fees, Tolls Tab

Data Fields

All dollar figures entered are assumed to be in the dollar year of the Contract being used.

- Charge per Veh Mile.** Average vehicle fees on a per mile basis, such as road user charges or mileage-based user fee.
- Charges per Veh Trip.** Average vehicle tolls and fees on a per trip basis. For transit modes, these tolls are assumed to be passed on directly to the passenger (and thus paid by the passenger as though it were a fee in addition to regular fares). If these charges would be paid by the agency to a road operator, rather than by the traveler to the road operator, they should not be recorded in *Travel*, but be included in the *Costs* page inputs as part of the operating expenses of the mode.
- Charge Per Pass Trip.** Average passenger fees per trip, such as for bus or train fares.
- Charge Per Pass Mile.** Average passenger per-mile fees, such as fares paid to some TNCs, taxis, and other on-demand transportation.

Safety

This tab is for safety incidents – fatalities, injuries, and vehicles associated with crashes – and adjustments.

Alternative	Region	Segment	Mode	Purpose	Fatalities per 100m VMT	Injuries Per 100m VMT	Crash-Involved Vehicles per 100m VMT	Crashes per 100m VMT
Base	Metro Region	Annual	Passenger Car	Business	1.299	123.70	433.18	
Base	Metro Region	Annual	Passenger Car	Commute	1.299	123.70	433.18	
Base	Metro Region	Annual	Passenger Car	Personal	1.299	123.70	433.18	
Base	Metro Region	Annual	Passenger Bus	Commute	5.120	315.94	250.98	

The Safety Tab

Data Fields

- **Fatalities per 100m VMT.** Number of fatalities estimated for each 100 million miles traveled.
- **Injuries per 100m VMT** Number of injuries of Unknown severity estimated for each 100 million miles traveled.
- **Crash-Involved Vehicles per 100m VMT.** Number of vehicles damaged per 100 million vehicle miles travelled. This is only available when the Crash Entry Method (in the Preferences window) is set to Crash-Involved Vehicles.
- **Crashes per 100m VMT.** Number of crashes per 100 million vehicle miles travelled. This is only available when the Crash Entry Method (in the Preferences window) is set to Crashes.

Considerations

When planning to entering safety data, consider whether you will use the rates method via the Safety tab (discussed here) or safety counts through the [Safety Counts](#) interface. Additionally, consider whether you want to get reports only on the social benefits of averted incidents or on social benefits and economic impacts. If you want to estimate economic impacts, you will need to select "Include" on the *Safety Economic Impact* radio buttons on the [Results Settings](#) page.

If a project adds distance traveled for both passenger car and bike/pedestrian travel, fatalities and injuries may be overestimated, since crash rates consider current average outcomes per mile. Defaults are provided for both as the modeled changes will typically be shifts between modes or within-mode analysis. The rates do not account for safety-in-numbers for non-occupants or the fact that many projects that increase bike/ped volumes will include safety improvements. When improving safety, consider using crash count inputs rather than default rates. Alternatively, crash rates can be zeroed out or reduced if increased bike/pedestrian trips should not be considered as facing increased crash risks beyond those represented by vehicular risks imposed on non-occupants.

Other

Other rates that are relevant to travel are set here.

PROJECT
TIMING
REGIONS
MODES
COSTS
TRAVEL
ACCESS
RESULTS

Congestion-Reliability Input Method
☒ Both
☐ Fraction Congested
☐ Buffer Time Index

Diagnostics
Save

Data Year
2031

Required Inputs
Occupancy
Congestion
Flow
Fuel
Charges, Fees, Tolls
Safety
Other

2031 2032 2033 2034 2035

Cancel Changes

Alternative	Region	Segment	Mode	Purpose	Fraction of Pavement in Poor Condition	Fraction of Hours Traveled with Adjusted VOT	Other Societal Benefits (\$/VMT)	Other Societal Costs (\$/VMT)
Base	Metro Region	Annual	Passenger Car	Business	0.00	0.00	0.0000	0.0000
Base	Metro Region	Annual	Passenger Car	Commute	0.00	0.00	0.0000	0.0000
Base	Metro Region	Annual	Passenger Car	Personal	0.00	0.00	0.0000	0.0000
Base	Metro Region	Annual	Passenger Bus	Commute	0.00	0.00	0.0000	0.0000

The Other Tab

Data Fields

- Fraction of Pavement in Poor Condition.** Fraction (0 to 1) of the road facility that is in "poor" condition. Penalty ratios are set on the Mode-Purpose level via the Modes page, via the *Adjust Mode Factors* button.
- Fraction of Hours Traveled with Adjusted VOT.** Fraction (0 to 1) of travel time whose value of time needs to be adjusted (depending on the mode, vehicle hours or in-vehicle passenger hours). Penalty ratios are set on the Mode-Purpose level via the Modes page, via the *Adjust Mode Factors* button.
- Other Societal Benefits (\$/VMT).** Dollars per VMT that need to be added to the benefits, due to societal benefits that are not otherwise accounted for in TREDIS.
- Other Societal Costs (\$/VMT).** Dollars per VMT that need to be subtracted from the benefits, due to societal benefits that are not otherwise accounted for in TREDIS.

Buttons on the Travel Page

There are 2 buttons at the top right of the screen and 5 running below the data entry grid serving various functions.

Cancel Changes

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Metro Region	Annual	Passenger Car	Business	101,875	1,021,806	40,872				
Base	Metro Region	Annual	Passenger Car	Commute	103,470	1,037,804	41,512				
Base	Metro Region	Annual	Passenger Car	Personal	103,260	1,035,698	41,428				
Base	Metro Region	Annual	Passenger Bus	Commute	107,970	1,082,939	43,318	5,398,500	54,146,955	2,165,878	269,925
Base	Metro Region	Annual	Passenger Bus	Personal	105,290	1,056,059	42,242	5,264,500	52,802,935	2,112,117	263,225
Base	Metro Region	Annual	Tractor Trailer Truck	Freight	10,415	104,462	4,178				
Project	Metro Region	Annual	Passenger Car	Business	101,875	1,023,844	40,954				
Project	Metro Region	Annual	Passenger Car	Commute	103,470	1,039,874	41,595				
Project	Metro Region	Annual	Passenger Car	Personal	103,260	1,037,763	41,511				
Project	Metro Region	Annual	Passenger Bus	Commute	107,970	1,085,099	43,404	5,398,500	54,146,955	2,165,878	269,925
Project	Metro Region	Annual	Passenger Bus	Personal	105,290	1,058,165	42,327	5,264,500	52,802,935	2,112,117	263,225
Project	Metro Region	Annual	Tractor Trailer Truck	Freight	10,415	104,671	4,187				

Enter Safety Incidents Counts Set to Override Mode Import Travel Data Freight Logistics Trip Balancing

The Travel Page with Buttons Highlighted

The Save button saves the current travel data shown on screen. For other functionality, click on any of the gray tabs below to jump to the appropriate section.

- [Diagnostics](#) View performance diagnostics for the data entered.
- [Safety Counts](#) Instead of using incident rates, enter count data for safety. Note: This may appear as *Enter Safety Incident Counts*, *View Basic Safety Counts Inputs* or *View Advanced Safety Counts Inputs* depending on the current project state.
- [Set to Override Mode](#) Enter costs directly.
- [Import Travel Data](#) Import travel data (without importing an entire project).
- [Freight Logistics](#) View and edit the commodity mixes and values for freight.
- [Trip Balancing](#) Check that trips between Base and Project balance, and change the share that are induced for analysis.

Diagnostics

The *Diagnostics* window gives you a quick way to check performance data entered on the *Travel* page to confirm it represents the expected changes to support economic development.

For example, it may be assumed that the Project alternative (often the "Build" alternative) represents improved facilities that will allow users to go faster. The travel characteristics input into the *Travel* screen may not reflect that, though, and the *Diagnostics* page allows you to catch that earlier in your analysis workflow, before running the full project.

Changes

The *Changes* tab is available for both Facility Based and O-D Based projects. It represents changes by year for trips, miles per trip, and speed.

On this page, all changes are calculated as Project value minus Base value, unlike the reports under the *Results* page. This is because it's more intuitive to highlight increases as positives here, especially improvements in speed.

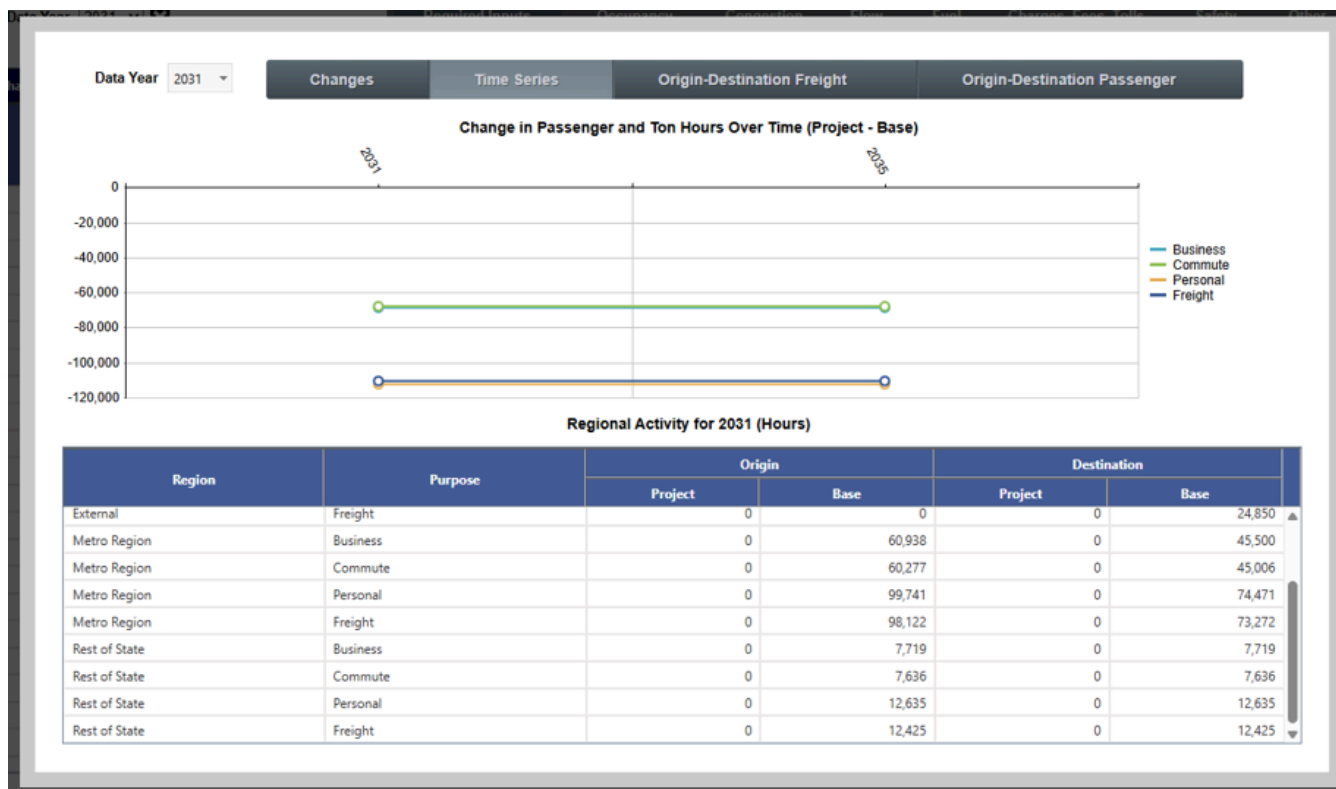
Changes by Year (Project - Base)									
From Region	To Region	Segment	Mode	Purpose	Passenger Trips			Project	
					Project	Base	Change		
Metro Region	External	Annual	Passenger Car	Personal	0	31,492	-31,492	0	▲
Metro Region	External	Annual	Tractor Trailer Truck	Freight	0	0	0	0	
Metro Region	External	Annual	Passenger Bus	Commute	0	917,745	-917,745	0	
Metro Region	External	Annual	Passenger Bus	Personal	0	894,965	-894,965	0	
Metro Region	Metro Region	Annual	Passenger Car	Business	0	113,183	-113,183	0	

The Diagnostics Page, Changes Tab

Time Series

The *Time Series* tab is only available for O-D Based projects.

In the top half of the *Time Series* tab, the graph labeled "Change in Passenger and Ton Hours Over Time" shows total changes in passenger hours and ton hours, summed by Purpose.



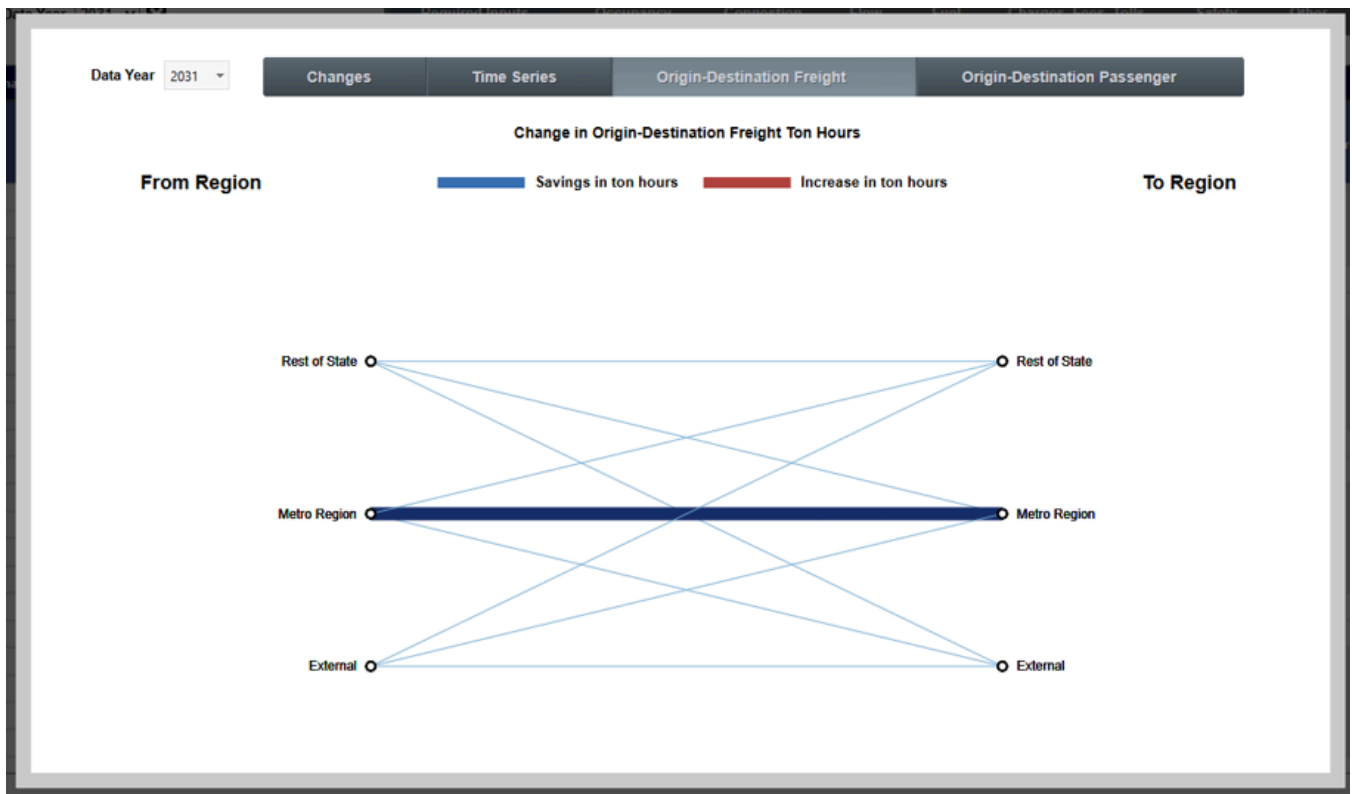
The Diagnostics Page, Times Series Tab

Toggle whether purposes are shown by clicking on the purpose label at right in the legend.

In the bottom table, "Regional Activity," you can see the total change by Origin and again by Destination. (Notice that both the Origin and Destination sections constitute the total universe of trips, so they cannot be added together, as this will double count all trips.) The year can be changed using the Data Year drop-down at top left.

Origin-Destination Freight and Passenger

The *Origin-Destination Freight* and *Origin-Destination Passenger* tabs show representations of ton-hours or passenger hours saved by direction of flow, with the origin region to the left and the destination right. Blue lines represent net savings (hours in project alternative are less than in base) and red line represent net increase (hours in project alternative are higher than in base). Hovering with your cursor over a line shows a pop-up detailing the project, base, and change values for the line, as in the figure. The Data Year is selected in the drop-down at top left.



The Diagnostics Page, Origin-Destination Freight Tab

Travel Cost Override

If you do not need TREDIS to calculate costs for you and already have total savings calculated, you may enter this data directly into TREDIS instead of entering travel data on the primary *Travel* page. This is an option for users with more comprehensive travel demand models. This option is not available for O-D Based Projects.

You can access this mode by clicking the *Set to Override Mode* button on the main *Travel* screen. Before proceeding, you will see a warning message telling you that any inputs you have entered on the main page are no longer being used.

Override Costs

Total cost levels are on the *Override Costs* tab.

- **Passenger Cost.** Total costs due to traveling passengers.
- **Crew Cost.** Total crew costs (drivers and other workers), including benefits and other non-wage compensation.
- **Freight Cost.** Total cost of moving of freight.
- **Reliability Cost.** Total cost of reliability.
- **Veh Operating Cost.** Total vehicle operating costs.
- **Toll Cost.** Total of all tolls incurred for this mode.
- **Safety Cost.** Total cost of safety incidents and crashes.
- **Environmental Cost.** Total cost of emissions.

Override Flow

Fractional flows are entered on the *Override Flow* tab to distribute the costs entered on the override *Costs* tab discussed directly above.

- **Fraction of Trips: Internal.** The fraction of annual trips that begin and end within the Region.
- **Fraction of Trips: Incoming.** The fraction of annual trips that begin outside the Region and have their destination in the Region.
- **Fraction of Trips: Outgoing.** The fraction of annual trips that originating within the Region but terminate externally.
- **Fraction of Trips: Through.** The fraction of annual trips that have both their origin and destinations outside the Region, where the vehicle passes through.

Import Travel Data

If you want to load your travel data using a spreadsheet, access this interface by clicking on the *Import Travel Data* button at the bottom of the *Travel* screen. This opens a window that contains a link for downloading a template populated with your project name, earliest operations year, alternatives, region name(s), and modes and purposes. Use this template to enter travel data for the years you have data. Make sure the worksheet (tab) is labeled "Travel Demand Characteristics".

Once you have your data ready, click on the browse button to select your file, and then click the upload button. Your data for all years contained in the spreadsheet will be loaded into the system.

Remember that there must be a tab in the spreadsheet named "Travel Demand Characteristics" and do not add, delete, or reorder the spreadsheet columns.

Freight Logistics

The *Freight Logistics* button opens a window for editing commodity mixes and valuation, and for viewing key cost factors. Access this functionality by clicking the *Freight Logistics* button at the bottom of the *Travel* page.

The screenshot shows the 'Travel' tab selected in the top navigation bar. Below the navigation bar, there is a 'Data Year' dropdown set to '2022'. A row of tabs includes 'Required Inputs', 'Occupancy', 'Congestion and Flow', 'Fuel', 'Charges, Fees, Tolls', and 'Other'. The 'Required Inputs' tab is active. Below this, a table lists various travel alternatives and their associated metrics. At the bottom, a row of buttons includes 'Import Travel Data', 'Set to Override Mode', 'Freight Logistics' (highlighted with a green border), and 'Trip Balancing'.

Alternative	Region	Period	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Default Region	Annual	Light/Medium Duty Truck	Freight	10,000,000	10,000,000	11,000,000				
Base	Default Region	Annual	Tractor Trailer Truck	Freight	10,000,000	10,000,000	11,000,000				
Base	Default Region	Annual	Jumbo Jet	Freight	0	0	0				
Project	Default Region	Annual	Light/Medium Duty Truck	Freight	10,000,000	10,000,000	10,000,000				
Project	Default Region	Annual	Tractor Trailer Truck	Freight	10,000,000	10,000,000	10,000,000				
Project	Default Region	Annual	Jumbo Jet	Freight	0	0	0				

Accessing the Freight Logistics Feature

Commodity Mixes

On the *Commodity Mixes* tab, you can edit the commodity mix for your region across four different directions of travel. Use the dropdown in the top left of the window to toggle between Internal, Incoming, Outgoing, and Through traffic.

The screenshot shows the 'Commodity Mixes' tab. At the top, there is a dropdown menu set to 'Incoming'. Below it, a row of tabs includes 'Commodity Mixes', 'Commodity Valuation (2022)', and 'Costs Summary (2022)'. The 'Commodity Mixes' tab is active. A warning message states: 'Warning, Commodity mix overrides will be updated and overwritten each time travel characteristics, modes or regions are altered. Any overrides should be re-applied in these cases if desired.' Below the warning, a table lists commodity descriptions and their freight mix values for different regions.

Region	Commodity Description	Jumbo Jet - Freight Mix	Tractor Trailer Truck - Freight Mix	Light/Medium Duty Truck - Freight Mix
Default Region	01 - Live animals/fish	0.000084449594	0.000268544542	0.000268544542
Default Region	02 - Cereal grains	0.000000000000	0.000887160651	0.000887160651
Default Region	03 - Other ag prods.	0.006094004811	0.051607849807	0.051607849807
Default Region	04 - Animal feed	0.822369130601	0.011415824764	0.011415824764
Default Region	05 - Meat/seafood	0.030580927741	0.053223426828	0.053223426828
Default Region	06 - Milled grain prods.	0.000100932527	0.041840799704	0.041840799704

Commodity Mixes Tab

Commodity Valuation

On the *Commodity Valuation* tab, you can edit the time sensitivity of different commodities if you'd like to apply different assumptions than the TREDIS defaults.

- **Value (\$ per Ton).** Value per US ton of the commodity, in the dollar year of the Contract.

- **Inventory Carrying Cost** The \$ per ton-hour of holding the inventory due to delays built into their scheduling and late docking fees applied because of trip scheduling.
- **Logistics Reliability Cost** The \$ per ton-hour of shipments that need to have buffer time.
- **Logistics Delay Cost** The \$ per ton-hour of logistics due to delays.

Internal	Commodity Mixes	Commodity Valuation (2022)	Costs Summary (2022)
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Cancel Changes							
Region	Freight Mode	Commodity Description	Time Sensitivity	2022			
				Value (\$ per ton)	Inventory Carrying Cost (\$ per ton-hour)	Logistics Reliability Cost (\$ per ton-hour)	Logistics Delay Cost (\$ per ton-hour)
Default Region	Tractor Trailer Truck	01 - Live animals/fish	H	3,911	0.150	8.044	0.150
Default Region	Tractor Trailer Truck	02 - Cereal grains	L	163	0.006	0.000	0.006
Default Region	Tractor Trailer Truck	03 - Other ag prods.	L	1,825	0.070	0.000	0.070
Default Region	Tractor Trailer Truck	04 - Animal feed	L	745	0.029	0.000	0.029
Default Region	Tractor Trailer Truck	05 - Meat/seafood	H	5,508	0.211	8.870	0.211
Default Region	Tractor Trailer Truck	06 - Milled grain prods.	M	2,213	0.085	8.183	0.085
Default Region	Tractor Trailer Truck	07 - Other foodstuffs	M	1,187	0.045	7.181	0.045
Default Region	Tractor Trailer Truck	08 - Alcoholic beverages	M	2,803	0.107	8.759	0.107
Default Region	Tractor Trailer Truck	09 - Tobacco prods.	M	152,103	5.828	154.627	5.828
Default Region	Tractor Trailer Truck	10 - Building stone	L	181	0.007	0.000	0.007
Default Region	Tractor Trailer Truck	11 - Natural sands	L	9	0.000	0.000	0.000
Default Region	Tractor Trailer Truck	12 - Gravel	L	9	0.000	0.000	0.000

Commodity Valuation Tab

Costs Summary

Key cost factors are summarized on the *Costs Summary* tab by mode using the commodity mix for the region for the direction in the drop-down at top left. This data can be used to trace results in the *Cost Savings by Type* report under the *Tracing/Validation* report group.

Internal	Commodity Mixes	Commodity Valuation (2022)	Costs Summary (2022)
----------	-----------------	----------------------------	----------------------

Region	Mode	Value of Delay by Commodity Sensitivity (\$ per ton-hour)				Value of Reliability by Commodity Sensitivity (\$ per ton-hour)			
		Low	Medium	High	All	Low	Medium	High	All
Default Region	Tractor Trailer Truck	0.01431	0.09876	0.62325	0.03898	0.01431	8.53928	14.43487	0.93765
Default Region	Light/Medium Duty Truck	0.01431	0.09876	0.62325	0.03898	0.01431	14.56028	20.45587	1.46150

Cost Summary Tab

Trip Balancing

When the total passenger trips for a given purpose rise between the Base and Project alternative, they are said to need "balancing" to indicate to TREDIS what portion of trips are induced by favorable transportation conditions.

Overview and Context

Trip balancing means differentiating the fraction of trips that can be considered "in-model" vs. those considered "induced."

"In-Model" trips represent trips that were undertaken in the Base alternative as well as the Project alternative, and which are assumed to have the same value for the people undertaking them.

"Induced" trips represent new trips undertaken in the Project alternative because travelers found new travel conditions that made a journey worthwhile when they were not in the Base alternative.

TREDIS assumes that the economic conditions are the same in any tested alternatives for a single scenario, so a different level of population and employment should not be the cause of trip "imbalance."

In some cases, a change in the number of trips between Base and Project alternatives is represented by in-model changes or a change in what inputs represent.

For example, if journeys made as one trip in the Base alternative are reported as two in the Project alternative – for instance, if a single bus trip now includes a transfer – the difference in the number of trips should be considered "in-model" because they don't represent new journeys.

Another case where differences might be in-model are in mode switching. If some percentage of commuters that drive have switched to bus, the number of bus passenger trips is likely to have risen, but the difference is "in-model" since only the mode has changed.

Induced trips are journeys that were not available or feasible in the Base alternative. For example, if highway speeds have improved due to an additional lane in the Project alternative, more trips may be undertaken versus the number in the Base alternative because of the marginal cost in time.

Differences in trip counts due to technical constraints in a microsimulation model should be handled before TREDIS rather than by the Trip Balancing window.

The Trip Balancing Window

To launch the *Trip Balancing* window, click on the *Trip Balancing* button at the bottom of the *Travel* screen.

The *Travel* page shown below has increases in total trips between the Base alternative and the Project alternative. The occupancy rates (on the following tab) for all modes and purposes have been set to 1.0 to simplify the example, so that vehicle trips are equal to person trips.

The *Trip Balancing* button is orange because it needs attention.

Data Year 2021

Required Inputs

Occupancy

Congestion and Flow

Fuel

Charges, Fees, Tolls

Other

2021

Alternative	Region	Period	Mode	Purpose	Period Veh-Trips	Period VMT	Period VHT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Eastern Area	Annual	Electric Car	Commute	10,000	0	0				
Base	Eastern Area	Annual	Electric Car	Personal	10,000	0	0				
Base	Eastern Area	Annual	Passenger Car	Business	100,000	0	0				
Base	Eastern Area	Annual	Passenger Car	Commute	9,990,000	0	0				
Base	Eastern Area	Annual	Passenger Car	Personal	9,990,000	0	0				
Project	Eastern Area	Annual	Electric Car	Commute	10,000	0	0				
Project	Eastern Area	Annual	Electric Car	Personal	10,000	0	0				
Project	Eastern Area	Annual	Passenger Car	Business	100,500	0	0				
Project	Eastern Area	Annual	Passenger Car	Commute	10,090,000	0	0				
Project	Eastern Area	Annual	Passenger Car	Personal	10,190,000	0	0				

The Travel Page with Trip Balancing Highlighted

In the figure, the number of Business trips rises from the Base alternative to the Project alternative by a total of 500. Dividing by the number of Base alternative Business trips, TREDIS finds a 0.5 percent increase ($500/10,000$). Though there are two modes used for Commute – Electric Car and Passenger Car – they are considered together for purposes of Commute travel, which in total rises 1 percent (change in total commute trips divided by over total commute trips in Base alternative, or $100,000/10,000,000$), while total Personal travel has risen by 2 percent.

In the figure below, the "50%" in the *Overall % Induced* column has been entered by the user to indicate that half of new traffic – any increase, regardless of purpose – is considered induced. This will be applied to each of the four modes shown in the other columns during Run Results.

MULTI YEAR BALANCING OVERRIDE
DETAILED YEARLY OVERRIDE

☐ Override by Purpose ☒ Override All Purpose

✕ Cancel Changes
✕

Data Year	Business Settings		Commute Settings		Personal Settings		Freight Settings		Overall % Induced
	% From Base	% Induced	% From Base	% Induced	% From Base	% Induced	% From Base	% Induced	
2021	0.50%	0.00%	1.00%	0.00%	2.00%	0.00%	0.00%	0.00%	50%

Warning, this override page will overwrite any settings used to determine if an imbalance in trips is due to induced behavior (positive only). Use this feature to quickly overwrite any imbalances by year, and then the followin tabs to adjust individual regional flows.

Note changes in this tab are applied to the successive tabs, but changes in other tabs are not reflected here

Save

Trip Balancing Overview Using Overall % Induced

In the next figure, by toggling to *Override by Purpose* using the radio button at the top of the page, the induced percentage can be set separately by year for each purpose (Business, Commute, Personal, and Freight), though in this case there is only 1 year.

MULTI YEAR BALANCING OVERRIDE

DETAILED YEARLY OVERRIDE

☒ Override by Purpose
 ☐ Override All Purpose

Cancel Changes

Data Year	Business Settings		Commute Settings		Personal Settings		Freight Settings		Overall % Induced
	% From Base	% Induced	% From Base	% Induced	% From Base	% Induced	% From Base	% Induced	
2021	0.50%	25 %	1.00%	12.5 %	2.00%	1.25 %	0.00%	0.00%	0.00%

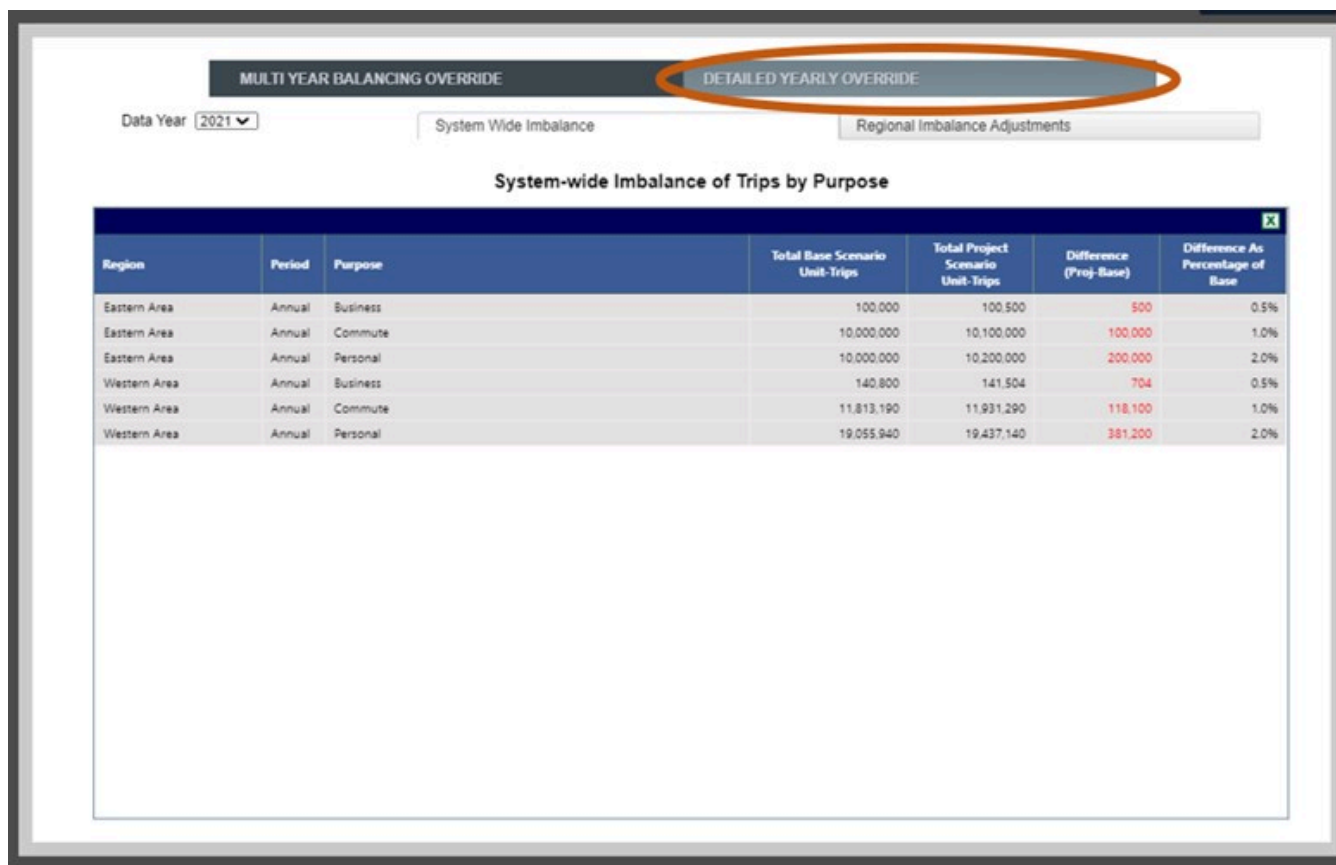
Warning, this override page will overwrite any settings used to determine if an imbalance in trips is due to induced behavior (positive only). Use this feature to quickly overwrite any imbalances by year, and then the followin tabs to adjust individual regional flows.

Note changes in this tab are applied to the successive tabs, but changes in other tabs are not reflected here

Save

Trip Balancing Overview Using Overall by Purpose

By clicking on the *Detailed Yearly Override* tab, you may reach the screen in the next figure showing the *System Wide Imbalance* table to see differences by region and period.



Trip Balancing Using Detailed Yearly Override

Finally, in this last figure, the *Regional Imbalance Adjustments* subtab opens a table where the percentage of induced activity can be set by purpose, by year, by region and by period (the most granular input structure).

MULTI YEAR BALANCING OVERRIDE
DETAILED YEARLY OVERRIDE

Data Year 2021

System Wide Imbalance
Regional Imbalance Adjustments

Total trips for some purposes are imbalanced. Please review and make adjustments if needed.

Regions with imbalances: Eastern Area

Trip Imbalance Summary

Region	Period	Purpose	Total Base Scenario Unit-Trips	Total Project Scenario Unit-Trips	Difference (Proj-Base)	Difference As Percentage of Base
Eastern Area	Annual	Business	100,000	100,500	500	0.5%
Eastern Area	Annual	Commute	10,000,000	10,100,000	100,000	1.0%
Eastern Area	Annual	Personal	10,000,000	10,200,000	200,000	2.0%

If the change in trips are unexpected, please close this window and adjust your inputs (veh-trips, pass-trips, or occupancy). If the change is expected, please set the fractions below to identify the change's source. Set as In-Model, if changes are due to different trip-chaining or touring behavior for the same travelers as the base case. Set as Induced, if changes are due to new trips being made for completely new activity (e.g. latent demand for travel).

Cancel Changes

Region	Period	Purpose	Change in Passenger - Trips	Change in Freight Tons - Trips	In-Model Fraction of Change	Induced Fraction of Change
Eastern Area	Annual	Business	500,000	0.000	1.000	0.000
Eastern Area	Annual	Commute	100,000,000	0.000	1.000	0.000
Eastern Area	Annual	Personal	200,000,000	0.000	1.000	0.000

Save

Trip Balancing Using Regional Imbalance Adjustments

Safety Incident Counts

On the *Other* tab in the main grid of *Travel* inputs, users have the option of entering the rates of incidents (fatalities, injuries and crashes) per 100 vehicle miles travelled. There is an alternate way to enter directly these not as rates but as simple counts.

To access this view, complete all other data inputs on the *Travel* page, including entering data for each year you have it for. This ensures that the *Safety Incident Counts* window will allow you to enter incident counts for those years.

To open the window, click the *Enter Safety Incident Counts* button.

Basic Safety Incident Counts

PROJECTTIMINGREGIONSMODESCOSTSTRAVELACCESSRESULTS

DiagnosticsSave

Data Year2021X

Required InputsOccupancyCongestion and FlowFuelCharges, Fees, TollsOther

20212022202320242025

Cancel ChangesX

Alternative	Region	Segment	Mode	Purpose	Period Veh-Trips	Period VMT	Period VWT	Transit Passenger Trips	Transit Passenger Miles	Transit Passenger Hours	Out of Vehicle Passenger Time
Base	Region 1	Annual	Passenger Car	Business	1,000,000	20,100,000	1,100,000				
Base	Region 1	Annual	Light/Medium Duty Truck	Freight	100,000	2,010,000	110,000				
Project	Region 1	Annual	Passenger Car	Business	1,010,000	20,000,000	1,000,000				
Project	Region 1	Annual	Light/Medium Duty Truck	Freight	101,000	2,000,000	100,000				

Enter Safety Incidents Counts

Set to Override Mode

Import Travel Data

Freight Logistics

Trip Balancing

Before clicking on a button, we recommend inputting all desired travel years. Primary Travel inputs affect button contents. Revisit buttons after adding years.

The Basic Safety Incidents Count Button on the Travel Page

On the resulting *Basic Safety Incidents Counts* window, you can enter incident counts for KABCO severity of fatalities (or "K") and injuries ("A", "B", "C", and "O") where severity counts are known, for each alternative, region, and segment combination. Additionally, you may enter counts for severity "U" when injuries are estimated or observed but where the severity is unknown.

Depending on how you have set the Crash Entry Method in the Preferences window, either the Crash-Involved Vehicles or Crashes column will be available for input.

Discard Counts & Use Incident Rates

Go To Advanced

Cancel Changes

Year	Alternative	Region	Segment	K	A	B	C	O	U	Crash-Involved Vehicles	Crashes
2021	Base	Region 1	Annual	0.221	1.00	2.00	3.00	4.00	22.11		124.21
2021	Project	Region 1	Annual	0.220	0.10	0.20	0.30	0.40	22.00		123.60
2025	Base	Region 1	Annual	0.221	1.00	2.00	3.00	4.00	22.11		124.21
2025	Project	Region 1	Annual	0.220	0.10	0.20	0.30	0.40	22.00		123.60

*KABCOU are person-injuries and person-fatalities, not crashes.

In Basic Incidents Counts mode, the safety incident rates for each mode-purpose in the Travel screen will be used proportionally to attribute safety incidents to mode-purposes.

Save

Close

?

Basic Safety Incidents Count Window

After clicking **Save** for any data entered, clicking the *Go To Advanced* button will take this data and attribute data to specific mode-purpose combinations and open the Advanced Safety Incidents Counts window.

Clicking *Discard Counts and Use Incident Rates* will discard the data entirely.

If you simply click *Close*, you will return to the Travel page and the project will use these Basic Incident Safety Counts unless you return to this window and click *Discard Counts* or *Go To Advanced*.

Advanced Safety Incident Counts

The *Advanced Safety Incident Counts* window is very similar to the *Basic Safety Incident Counts* window, but allows you to adjust counts for individual mode-purpose combinations where they are known. When first deployed, the window will pre-populate the counts based on any data entered in the Basic Safety Incident Counts window and the underlying Incident Rates that are given on the Travel page.

After clicking **Save** for any data entered, clicking the *Go To Basic* button to discard any Advanced Data entered and return to using the Basic Safety Incident Counts view.

Clicking *Discard Counts and Use Incident Rates* will discard the data for both Basic and Advanced and return to using the default incident rates provided in the *Travel* page.

If you simply click *Close*, you will return to the *Travel* page and the project will use these Advanced Incident Safety Counts unless you return to this window and click *Discard Counts* or *Go To Basic*.

Discard Counts & Use Incident Rates

Go To Basic

Cancel Changes

Year	Alternative	Region	Segment	Mode	Purpose	K	A	B	C	O	U	Cash-Involved Vehicles	Crashes
2021	Base	Region 1	Annual	Passenger Car	Business	0.201	0.91	1.82	2.73	3.64	20.10		112.92
2021	Base	Region 1	Annual	Light/Medium Duty Truck	Freight	0.020	0.09	0.18	0.27	0.36	2.01		11.29
2021	Project	Region 1	Annual	Passenger Car	Business	0.200	0.09	0.18	0.27	0.36	20.00		112.36
2021	Project	Region 1	Annual	Light/Medium Duty Truck	Freight	0.020	0.01	0.02	0.03	0.04	2.00		11.24
2025	Base	Region 1	Annual	Passenger Car	Business	0.201	0.91	1.82	2.73	3.64	20.10		112.92
2025	Base	Region 1	Annual	Light/Medium Duty Truck	Freight	0.020	0.09	0.18	0.27	0.36	2.01		11.29
2025	Project	Region 1	Annual	Passenger Car	Business	0.200	0.09	0.18	0.27	0.36	20.00		112.36
2025	Project	Region 1	Annual	Light/Medium Duty Truck	Freight	0.020	0.01	0.02	0.03	0.04	2.00		11.24

*KABCOU are person-injuries and person-fatalities, not crashes.

Save

Close

?

Advanced Safety Incidents Count Window

Access

TREDIS can report on economic impacts beyond those spending and travel efficiency. The *Access* modules leverage additional user inputs to estimate economic impacts from two other major sources.

These are separate from economic impacts stemming from spending (as entered on the *Costs* page) and travel improvements (entered on the *Travel* page). Click on the page name to jump to that section.

- [Intercity Access](#). The *Intercity Access* module estimates how improvements in access on a county level can have economic impacts.
- [Contingent Development](#). The *Contingent Development* module is for situations where new economic activity is contingent on a project being built, and the Project alternative should reflect the economic impacts of that activity.

Intercity Access

The primary benefits of transportation investments are often expressed in terms of time, cost, and/or safety for travelers moving between trip origins and destinations. However, there can be wider economic benefits when businesses gain access to broader labor, customer, and/or supplier markets. These effects increase productivity through what economists call agglomeration economies by increasing scale economies of production, matching of specialized worker skills to business needs, or matching of specialized business products or services to customer needs.

TREDIS recognizes three spatial ranges of market access effects.

- **Local Market** access focuses on urban-scale labor markets and consumer markets, which largely occur within a travel time range.
- **Regional Market** access focuses on same-day freight deliveries and same-day tourism, which largely occur within ranges of up to four hours each way. It can also generate —mega-region economic integration— benefits by connecting regions that have complementary industries.
- **Access Times for Intermodal Connectivity** focuses on the ability to access airports, rail terminals, and marine ports, which are gateways to broader national and international markets for people and freight.

Guidance

Not all projects or programs analyzed in TREDIS will have market access benefits. In general, they occur when there is a new or substantially improved network connection between population and business centers, or expanded modal options, or a shift to higher density development. A typical analysis will address at most just one or two of these categories.

- **Local Market — Corridor Investment.** A corridor investment will connect a city to outlying areas, increasing the population within commuting range of the city and vice versa (connecting at least 15,000 people in outlying areas).
- **Regional Market — Corridor Investment.** A corridor investment will enlarge the same-day travel and delivery market surrounding an employment center (adding at least 20,000 population or a business base of over 10,000 workers to that market).
- **Airport Access Time.** A corridor investment will shorten average travel time from the city to a major airport (by at least 15 minutes).
- **Freight Rail Access Time.** A corridor investment will shorten average travel time from the city to a TOFC/COFC terminal (by at least 10%).
- **Marine Port Access Time.** A corridor investment will shorten average travel time from the city to a major marine port (by at least 10 minutes).

Regional Access Definition

The *Regional Access Definition* tab is the first step in defining access changes. The first Region defined on the *Regions* page is the selected region by default, but you can choose any Region. Each Region will have defaults for the selections, including the *County of Focus* and the intermodal access points.

These selections become relevant when you enter data on the *Inputs* tab, since the selections on the *Regional Access Definition* tab determine the baseline that all the data entered in *Inputs* is in reference to.

The map in the lower left corner shows all the Regions defined for the analysis. The main map shows just the current selections.

The Region Access Definition Tab

- **Region Name.** Select one of the regions you defined on the *Regions* page. All the subsequent selections depend on this selection.
- **County of Focus.** Select one of the counties within the Region. All the subsequent selections depend on this selection.

Airport Name, Freight Rail Terminal, and Port Name are all dropdowns (where multiple are available) to indicate the average time to reach the facility from closest to the most populous city in the county selected. Defaults are provided.

- **Airport Name** options are mid- to large airports.
- **Freight Rail Terminal** options are TOFC/COFC terminals.
- **Port Name** options are marine ports.

The selected options are shown on the main map.

Once all your selections are made, click the *Save and Reset Inputs* button to update the *Inputs* tab with default data for your selections.

Inputs - Business Access

On the *Inputs* tab, under the *Business Access to Population (Consumers and Labor Market Proxy)* and *Business Access to Businesses (Employment)* sections, you can enter values for Base and Project alternatives representing the total accessible population or number of jobs.

TREDIS automatically fills in identical default values for the Base and Project alternatives when the project is created. You may substitute your own inputs if available, keeping in mind that inputs for the Project alternative should match the Base alternative except where changes are to be expected.

Intercity Access

Contingent Development

Regional Access Definition

Inputs

Save

Cancel Changes

Region	Alternative	Business Access to Population (Consumers and Labor Market Proxy)					Business Access to Businesses (Employment)				Access Time (Minutes)			
		40 min	1 hr	2 hrs	3 hrs	4 hrs	1 hr	2 hrs	3 hrs	4 hrs	Airport	Freight Terminal	Passenger Terminal	Port
Boston Area	Base	2,253,428	3,899,263	10,349,192	13,209,044	17,840,979	5,687,250	7,095,559	9,006,948	11,804,796	83	61	58	5
Cape and Islands	Base	186,144	385,953	3,722,427	8,769,185	12,271,828	535,882	2,680,965	6,031,912	8,349,617	98	119	119	92
Western Mass	Base	1,085,552	3,440,465	11,565,714	16,012,136	30,900,001	5,069,395	7,849,346	10,741,231	20,850,209	12	62	9	129
Boston Area	Project	2,275,962	3,899,263	10,349,192	13,209,044	17,840,979	5,687,250	7,095,559	9,006,948	11,804,796	83	61	58	5
Cape and Islands	Project	186,144	385,953	3,722,427	8,769,185	12,271,828	535,882	2,680,965	6,031,912	8,349,617	98	119	119	92
Western Mass	Project	1,085,552	3,440,465	11,565,714	16,012,136	30,900,001	5,069,395	7,849,346	10,741,231	20,850,209	12	62	9	129

The Inputs Tab

Metrics

The columns under the *Business Access to Population* section represent the number of people that can reach the center of the county by car in the indicated amount of time. The *Business Access to Businesses* metrics are similar, except they measure the number of jobs. So, in the row for Boston Area, the value under *Business Access to Population - 40 min* column indicates the population that can reach the center point by car within 40 minutes, and the *Business Access to Population - 4 hrs* column indicates the number that can reach the center point by car within 4 hours. In the same row for Boston Area, *Business Access to Businesses - 3 hrs*, for example, indicates the number of jobs that can be reached from the center point by truck within 3 hours.

Significance

For *Access to Population* metrics, the population is taken to be a proxy for the potential labor market that can be employed by firms or consumer market that can be served by firms. With the goal of capturing consumer markets using typical variables available in models, we do not separately measure the number of workers in the calibration data or model application. An increase in the market size for a given distance metric between the *Base* and *Project* alternatives means there is a greater pool of talent available to employers, leading to better employment matching, or more access to consumers.

For *Access to Business* metrics, the measure of jobs indicates potential business relationships that can be leveraged for firms that provide or rely on other inputs.

Preparation

Access to Population and *Access to Business* both use access measures that normally require a network analysis, utilizing skim trees to identify all Traffic Analysis Zones (TAZs) reachable within various time thresholds from the

central point. There are multiple time bands to enable impact decay functions, whereby local market access effects decay over a 40-minute to 1-hour range, while regional market access effects decay over a 1-4 hour range. See documentation for published research supporting these decay patterns.

Inputs - Access Time

Ports, terminals, and intermodal facilities are gateways to broader national and international markets for people and freight, and reducing time to access them can improve connectivity and thus productivity.

On the *Inputs* tab, under the *Access Time* section, enter values for Base and Project alternatives representing the time to access the facility defined in the regional access definition.

When your project is created, TREDIS automatically fills in identical default values for the Base and Project alternatives based on your regional access definition. You may substitute your own inputs if available, keeping in mind that inputs for the Project alternative should match the Base alternative except where changes are to be expected.

The metrics are all assumed to be in minutes, representing the average time to the terminal or intermodal facility via truck or car from the central point. A decrease in access time shows how The *Access Time* columns for airports, rail terminals and marine ports are normally calculated by a highway network model to calculate the shortest time path from each zone's designated city/town center.

Contingent Development

TREDIS provides an option for modeling Contingent Development, which is expected economic development that is contingent upon transportation investment. Industry impacts may be entered as sales (output) in millions of dollars or as employment as the total number of jobs added.

An example situation where Contingent Development would be useful is a warehouse that is being considered for development depending on whether access is improved. In the *Project* alternative, access is improved, and the warehouse is built, adding output and jobs to the local economy (whereas, in the *Base* alternative, the warehouse would not be built so no added output or jobs would be present).

This is useful because it allows further accounting within TREDIS (and thus within the Economic Impacts Analysis provided by TREDIS) for important economic events that are not directly reflected in improved travel efficiency (which would be reflected in inputs on the *Travel* page) or new construction or maintenance commitments (which would be reflected in inputs on the *Costs* page).

Entering Inputs

For a new project, on landing on the *Contingent Development* tab (under the *Access* page), you will see no records entered yet, as in the figure below. The box highlights the controls for choosing the Region and year where the contingent development would take place.

PROJECTTIMINGREGIONSMODESCOSTSTRAVELACCESSRESULTS

Intercity AccessContingent Development

Boston Area2031Create recordsDelete RecordsSave

2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050

Cancel ChangesAll inputs should be entered as constant 2023 \$M

Industry

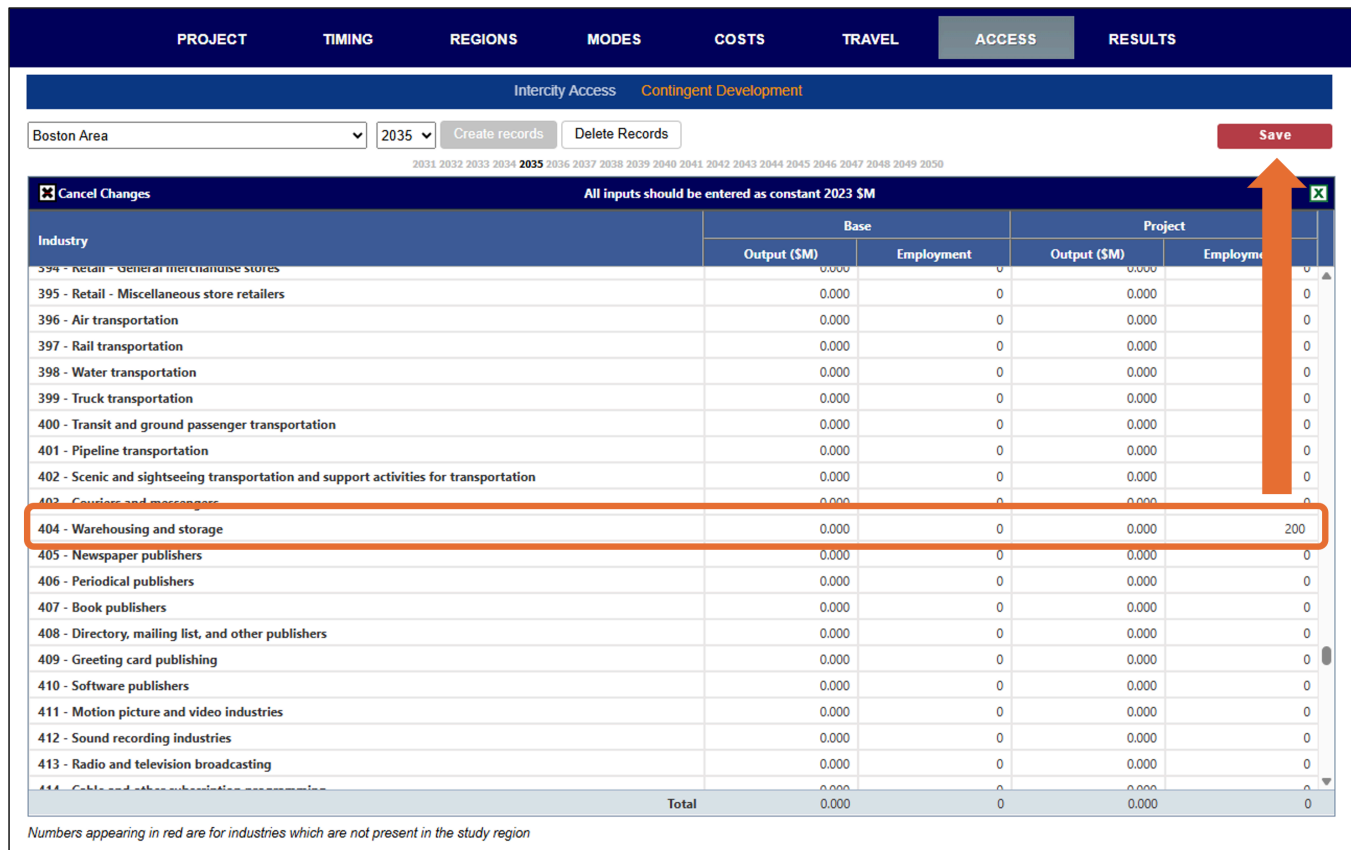
No records available.

Total

Numbers appearing in red are for industries which are not present in the study region

The Contingent Development Tab with No Records Created

In this example, where a warehouse would be built contingent on the *Project* alternative being built, we enter 200 new jobs that the warehouse would support in the appropriate industry, then click the *Save* button to save this record.



Intercity Access Contingent Development

Boston Area 2035 Create records Delete Records Save

2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050

Cancel Changes All inputs should be entered as constant 2023 \$M

Industry	Base		Project	
	Output (\$M)	Employment	Output (\$M)	Employment
394 - Retail - General merchandise stores	0.000	0	0.000	0
395 - Retail - Miscellaneous store retailers	0.000	0	0.000	0
396 - Air transportation	0.000	0	0.000	0
397 - Rail transportation	0.000	0	0.000	0
398 - Water transportation	0.000	0	0.000	0
399 - Truck transportation	0.000	0	0.000	0
400 - Transit and ground passenger transportation	0.000	0	0.000	0
401 - Pipeline transportation	0.000	0	0.000	0
402 - Scenic and sightseeing transportation and support activities for transportation	0.000	0	0.000	0
403 - Couriers and messengers	0.000	0	0.000	0
404 - Warehousing and storage	0.000	0	0.000	200
405 - Newspaper publishers	0.000	0	0.000	0
406 - Periodical publishers	0.000	0	0.000	0
407 - Book publishers	0.000	0	0.000	0
408 - Directory, mailing list, and other publishers	0.000	0	0.000	0
409 - Greeting card publishing	0.000	0	0.000	0
410 - Software publishers	0.000	0	0.000	0
411 - Motion picture and video industries	0.000	0	0.000	0
412 - Sound recording industries	0.000	0	0.000	0
413 - Radio and television broadcasting	0.000	0	0.000	0
414 - Cable and other subscription programming	0.000	0	0.000	0
Total	0.000	0	0.000	0

Numbers appearing in red are for industries which are not present in the study region

Saving New Inputs in the Contingent Development Tab

If this new economic impact would last for the remainder of the *Operations Period* (defined on the *Timing* page), nothing more needs to be done. If another facility or change in the economic picture would occur in another year or region, enter that as a separate record.

For example, if the warehouse opening in 2035 (entered in the above example) with 200 jobs would expand in 2037 to support 400 jobs, create a record for 2037 and enter the data to model that.

In addition to commercial, retail, industrial and government sectors, the Contingent Development module also supports changes in households' "output" - here understood to be household income. Any change that would increase households' ability to spend could be input as a difference between the *Base* and *Project* values in the first "Industry" listed, *Household Spending*. Enter data in the *Output (\$M)* to model any changes between the alternatives in households' income.

Interpolation

In cases where Contingent Development is entered for some years but not others, TREDIS interpolates and expands Contingent Development values to other years using rules similar to those used to expand and interpolate *Travel* characteristics. Trends of increasing or decreasing values are respected between and beyond the years input. This is intended to simplify data entry for those wanting to enter Contingent Development across multiple years where trends are observed but modeling has not been explicitly done.

Imputation between explicit zero values and non-zero values is allowed, as well as beyond the final input year, which is similar to how *Travel* data is expanded. When no zero value is explicitly set, all years until the first explicit entry are treated as zeros. Notably, this last rule is different from the method to expand *Travel* data across years, but is more intuitive for the behavior of Contingent Development, where discontinuous values are much more likely to be modeled. For instance, if a new factory, warehouse, or other source of employment opens in a given year, it might be very natural to model a large increase in the employment in that year that is a discontinuous jump from the year before.

Results Settings

If you are visiting the *Results* page for the first time for a project, or if you have saved any changes to inputs, going to the *Results* tab on the top navigation bar of TREDIS will navigate to the *Results Settings* page automatically.

Help Manual Illustration - 1 Year

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Equity Freight VIA

Interpolation Method Depreciation Type

Charge Interpolation B/C Perspective ☐ Study Region ☒ National Perspective

Safety Economic Impact ☐ Include ☒ Exclude

Run Analysis

Revert Settings Costs of Emissions by Year

Results Settings with Defaults

If you've already run the analysis, click on the gear icon on the far left of the results report menu to return to the settings used to run the report.

Before running your analysis to generate results, please review the default settings and make adjustments as desired. Note, the analysis takes a few moments to run. TREDIS saves your results and will show them without needing to run the analysis again unless you change a value in the settings on this screen or go back to your project and change other inputs.

After the primary analysis, you can run a freight analysis. See [Running Freight Analysis](#) for Transearch and vFreight settings. The results navigation bar allows you to switch between report categories or go back to settings to change the parameters used in the analysis.

Review and if desired change the default settings for running your analysis, then press the *Run Analysis* button. Anytime you make a change to the settings or any inputs on the prior screens, you will need to rerun your analysis. Once finished, you are brought to the *Summary* screen.

Settings

- **Interpolation Method.** This feature is used when TREDIS needs to compute travel characteristics values for year in which no user input is provided. The user may select from the dropdown menu using Compound Annual Growth rate or Straight Line Growth rate.
- **Charge Interpolation.** Select None or Main Method. The None selection will use a step interpolation of charges. The Main Method will use the method chosen for Interpolation Method for charges.
- **Depreciation Type.** Users may select whether to use a One-Time Project level depreciation method, where depreciation is computed for all project costs at once, or taking depreciation as an Annual Program, computing depreciation for each investment separately.

- **B/C Perspective.** Select your analysis perspective: by Study Region or at a National level.
- **Safety Economic Impact.** Select “Include” if you want the economic impact analysis to include impacts from changes in safety. Select “Exclude” otherwise. (The impacts from safety are calculated separately from safety benefits as reported in the Benefit-Cost Analysis, which are always reported.)
- **Emissions Accounting.** Select “Well-to-Pump and Tailpipe” if you want the benefit-cost analysis to include both sources of emissions in calculations of the production and cost of CO2e. Select Tailpipe “Emissions only” if you want only tailpipe emissions used.

Buttons

Once you have selected your settings, press the *Run Analysis* button.

- **Run Analysis.** Begin analysis of this project. The process will take a few moments and a popup window will appear to let you monitor progress. Once analysis is completed, you will not need to re-run the analysis unless you save new data on a previous page or on this Settings here.
- **Revert Settings.** Reset any changes made so far to the settings. This prevents the analysis from needing to be re-run if you inadvertently made changes to settings that you don't need.
- **Costs of Emissions by Year.** Opens a window allowing the update of default emissions costs for the project by the emissions type by year.

Costs of Emissions by Year

The *Cost of Emissions by Year* button opens a window as shown in the figure below.

Region	Year	Cost per Metric Ton VOC	Cost per Metric Ton NO _x	Cost per Metric Ton SO ₂	Cost per Metric Ton PM 2.5	Cost per Metric Ton CO ₂
External	2037	2,778.00	22,900.00	63,700.00	1,108,000.00	297.00
External	2038	2,778.00	22,900.00	63,700.00	1,108,000.00	301.00
External	2039	2,778.00	22,900.00	63,700.00	1,108,000.00	305.00
External	2040	2,778.00	22,900.00	63,700.00	1,108,000.00	310.00
Grand Rapids MSA	2025	2,778.00	21,100.00	56,800.00	1,011,100.00	246.00
Grand Rapids MSA	2026	2,778.00	21,400.00	58,100.00	1,029,700.00	250.00
Grand Rapids MSA	2027	2,778.00	21,800.00	59,500.00	1,048,800.00	254.00
Grand Rapids MSA	2028	2,778.00	22,100.00	60,800.00	1,068,200.00	259.00
Grand Rapids MSA	2029	2,778.00	22,500.00	62,300.00	1,087,900.00	262.00
Grand Rapids MSA	2030	2,778.00	22,900.00	63,700.00	1,108,000.00	267.00
Grand Rapids MSA	2031	2,778.00	22,900.00	63,700.00	1,108,000.00	272.00

Cost of Emissions by Year Window

When estimating costs in TREDIS, these costs will be applied by year and by region for each metric ton of emissions attributed to that region.

In this case the national defaults are displayed in red to indicate they don't align with the current Preference setting for emissions values from Local Defaults. Clicking the *Set to Local Defaults* button here will set those changed values back to the local defaults and save the data. Users can switch between local defaults and national defaults by using the *Preferences* in conjunction with the *Costs of Emissions by Year* interface, and can override anything by manually entering data in the grid.



Region	Year	Cost per Metric Ton VOC	Cost per Metric Ton NO _x	Cost per Metric Ton SO ₂	Cost per Metric Ton PM 2.5	Cost per Metric Ton CO ₂
External	2037	2,778.00	22,900.00	63,700.00	1,108,000.00	297.00
External	2038	2,778.00	22,900.00	63,700.00	1,108,000.00	301.00
External	2039	2,778.00	22,900.00	63,700.00	1,108,000.00	305.00
External	2040	2,778.00	22,900.00	63,700.00	1,108,000.00	310.00
Grand Rapids MSA	2025	2,778.00	21,100.00	63,700.00	1,108,000.00	246.00
Grand Rapids MSA	2026	2,778.00	21,400.00	63,700.00	1,108,000.00	250.00
Grand Rapids MSA	2027	2,778.00	21,800.00	63,700.00	1,108,000.00	254.00
Grand Rapids MSA	2028	2,778.00	22,100.00	63,700.00	1,108,000.00	259.00
Grand Rapids MSA	2029	2,778.00	22,500.00	63,700.00	1,108,000.00	262.00
Grand Rapids MSA	2030	2,778.00	22,900.00	63,700.00	1,108,000.00	267.00
Grand Rapids MSA	2031	2,778.00	22,900.00	63,700.00	1,108,000.00	272.00

Buttons: **Reset to Default**, **Save**, **Close**, **?**

Costs of Emissions by Year with Changes

Running Freight Analysis

If your license includes TREDIS with Transearch or vFreight, the *Results Settings* page will feature a *Run Freight* button below the primary *Run Analysis* button.

To run a freight analysis, the primary analysis needs to be run first. Once completed, adjust the freight-specific settings and click the *Run Freight* button to begin the freight analysis.

The freight specific settings are as follows:

- **Select Years to Analyze.** For both Transearch and vFreight data. Any years from operations may be selected.
- **Use Transearch Forecast.** Only for Transearch data.
- **Enable ReWeight.** Only for vFreight. Check this box to have the system consider consumption and production levels of trading partners relative to each other as part of the freight analysis.
- **Enable Empties.** ONLY for vFreight. Check this box to include the effects of empty/back haul vehicles in the analysis.

Once run, [freight reports](#) for *Transearch* or *vFreight* will be available.

Results

The first time you visit the *Results* page for a project you've created, you will see the [Results Settings](#) page. Confirm or change any settings and click the *Run Analysis* button.

The analysis may take time to run. Once completed, you will see results reports available to view. TREDIS saves these results until you re-run them using new settings or edit input data.

From the *Results Reports* view, the results navigation bar allows you to switch between report categories or go back to settings to change the parameters used in the analysis.

If your license includes freight data, see [Running Freight Analysis](#) for Transearch and vFreight settings.

If you want to re-run the analysis with new settings after it has been run the first time, click on the gear icon on the far left of the screen to open the [Results Settings](#) page.

Reports Available

Each named tab on this *Results* page corresponds to a suite of reports available after an analysis has been run:

- [Summary](#). A graphical snapshot of your project results.
- [Economic Impact](#). Details on the jobs, wages, business output, and value added economic impacts that are a result of the project modeled.
- [Benefit - Cost](#). Comprehensive details on the present value of the benefits and costs, benefit-cost ratios, environmental factors, performance metrics and the grant report for use in completing federal grant applications.
- [Financial Impact](#). Information on tax impacts, cost & revenue sharing, and investment return analyses.
- [Tracing/Validation](#). Details supporting the other reports in the system.
- [Equity](#). Equity context reports using data on the defined regions and results from other reports.
- [Freight](#). Details on freight activity. This section only available if you have Transearch or vFreight included in your TREDIS license and you have run freight analysis on your project.

Results Summary

After a TREDIS analysis has finished processing, results are stored for the project and may be viewed. The *Summary* tab is the landing tab when accessing the *Results* page.

The *Results Year* dropdown menu allows you to select the year viewed on the *Summary* tab. The default is the last year of operations. The *Impact Type* dropdown allows you to filter the Economic Impact and Jobs by Year results. The default selection is “Total Impact,” meaning all sources combined, but the filter can be set to Construction, O and M, Operations, Contingent Development, or Market Access to identify specific sources.



Results – Graphics Report

Travel Changes. Bars indicate whether vehicle trips, miles traveled, and hours traveled rose or fell between the base and project alternatives.

For example, a rise of 2% in the Vehicle Miles Traveled (VMT) bar means there were more miles traveled in the Project alternative compared to the Base alternative. A drop of 7% in the Vehicle Hours Traveled (VHT) bar means there were fewer hours traveled in the Project alternative (which will translate to time savings).

Societal Benefit. Bars indicate the social benefits enjoyed in the Project alternative as compared to the Base alternative, broken out by traveler benefits, environmental social benefits, and wider economic benefits.

An increase of \$300 million in traveler benefits means travelers were better off in the Project alternative, while a drop of \$40 million in environmental and social benefits mean there were some disbenefits in the Project alternative.

Economic Impact. Bars indicate the increase in Gross Regional Product (GRP) in the Project case, by industry sector. For example, the blue bar at about \$10 million indicates an increase in about that much GRP for the Project alternative (vs. the Base alternative).

Jobs by Year. The graph shows the number of extra jobs supported by the Project alternative over the Base alternative.

Economic Impact Reports

TREDIS allows you to filter your results using the dropdown menu controls at the top of many of the economic impact results screens. Note that not all controls appear on each results screen.

- **Impact Type.** Filter for the type of impact or “Total Impact” for the sum of all impact types. The following can be selected:
- **Construction** impacts stem from amounts spent in the Construction Years on capital improvements and planning, as entered on the *Costs* page.
- **O and M** impacts stem from operations and maintenance spending in the Operations Years, as entered on the *Costs* page.
- **Operations** impacts stem from changes in travel behavior as entered on the *Travel* page.
- **Contingent Development** impacts stem from output or employment changes that are not directly reflected in travel changes but which are contingent on an infrastructure project (or other change) being implemented. Inputs resulting in these would be entered in the *Access* page under the *Contingent Development* tab.
- **Market Access** impacts stem from improved job matching and business-to-business structural improvements. Inputs resulting in these would be entered in the *Access* page under the *Intercity Access* tab.

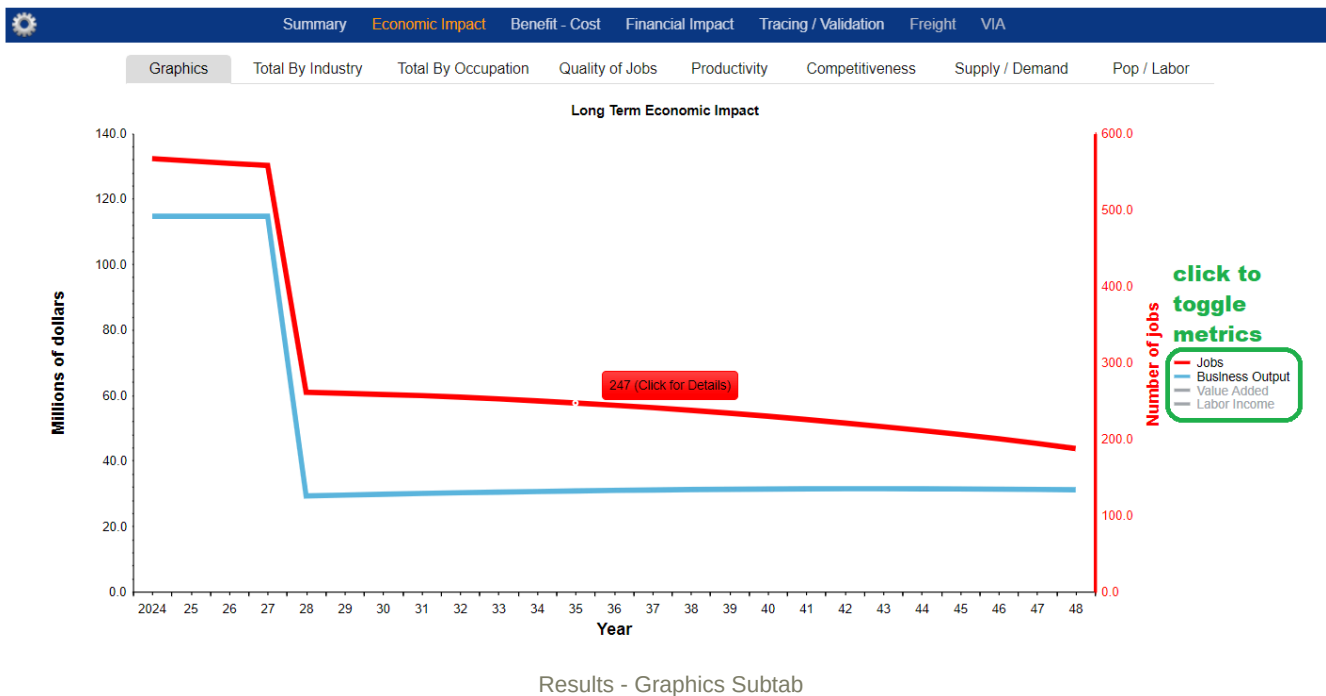
Economic Activity. This control allows you to adjust the results view to look at the comparison between Project versus Base, the Base results, or the Project results.

Industry Aggregation. The Industry Aggregation menu allows you to adjust the industry details viewed in the results, with increasing levels of detail. Note: The larger the number of sectors, the longer the report. We recommend beginning with the 14- or 53- sector reports, then changing if needed to a more detailed report.

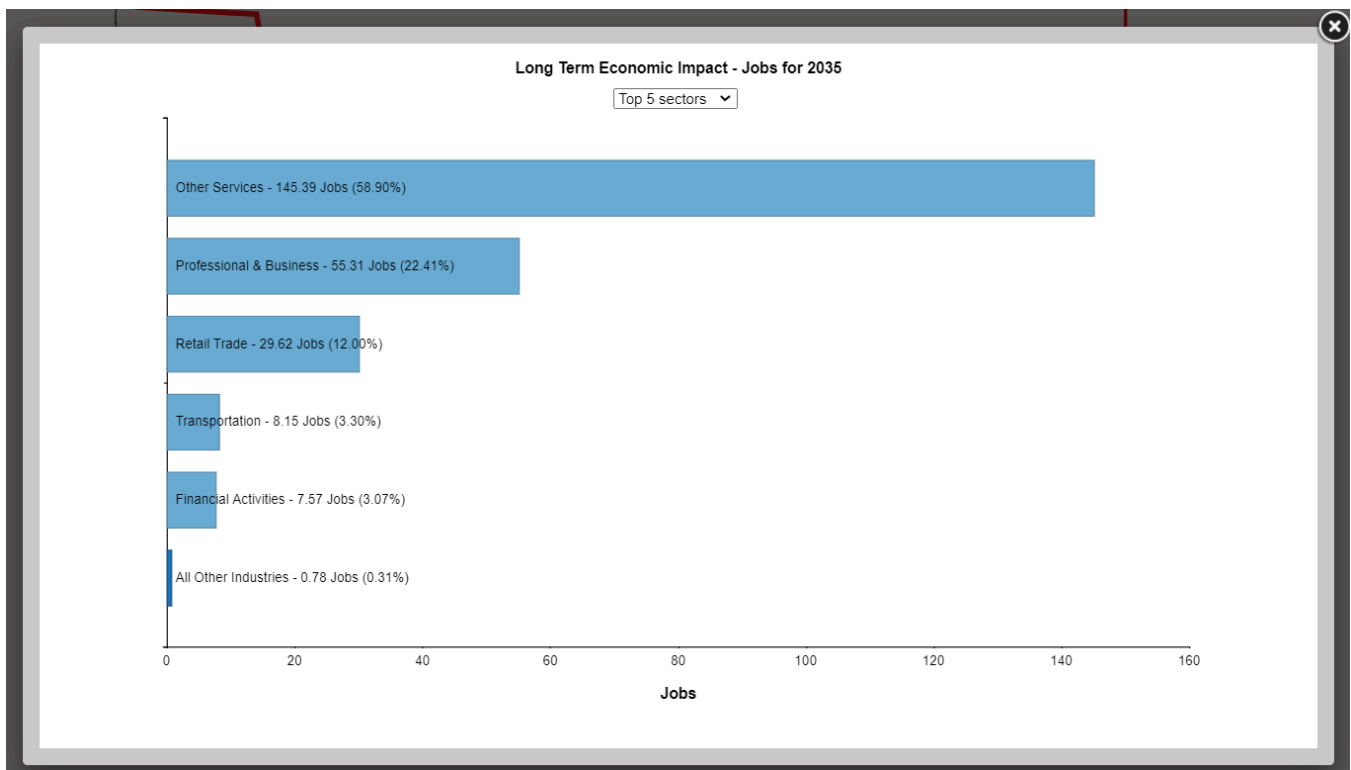
Occupational Aggregation. The Occupational Aggregation menu allows you to adjust the details viewed in the results at the 2-, 3-, or 4-digit occupational code level.

Graphics

The *Economic Impact* tab opens with a summary graphic showing for the sum of all regional jobs, business output, value added, and wage income by year. Toggle on and off metrics to show by clicking on them in the legend.



In the screenshot, hovering on the red line where it crosses year 35 will show the value for that year, in this case 127. Clicking on this data point will open a graph showing by-industry breakdown of the metric (in this case, jobs). This view begins with the top five industry sectors, which may be changed using the drop-down menu under the graph title.



Results – Graphics with Detailed Breakout

Total by Industry

This interactive report presents the economic impacts of the project by year and for all regions in the project. The number of industries is determined by the Results control panel option *Industry Aggregation*. The NAICS codes associated with them are provided.

Core metrics of Business Output, Value Added, and Labor Income are in millions.

Impact Breakout

This report gives breakdown by the impact type: "Direct", "Indirect", or "Induced" effects, as well as by the source.

Total by Occupation

This matrix provides a profile of the occupational type of jobs that are being generated by the project. This type of information is important for economic developers. Much like industry, you can change the level of aggregation reported with an option on the Results control panel, Occupational Aggregation. Occupation codes are SOC codes.

Core metrics of Business Output, Value Added, and Labor Income are in millions.

Quality of Jobs

The Quality of Jobs report shows characteristics of the jobs created by the project, with details categorizing occupations by wage criteria (High Wage, Medium Wage, Low Wage) and whether jobs in each category are growing or not.

By clicking on the tabs above the graph, you can toggle between viewing Quality of Jobs as a chart or table.

- **Not Growing** means an occupation is projected to grow less than 0.5% annually.
- **Growing, Unstable** means an occupation is growing but turnover is relatively high.
- **Growing, Stable** means an occupation have relatively less turnover.

The growth benchmark of 0.5% annual growth is set by research into the projected 2018-2028 growth trends. For context, no-growth occupations employed 36.1 million workers in 2018.

The stability benchmark is set around a premium of 25% more openings per year than the average occupation (after accounting for openings occurring from overall growth). The average turnover has been calculated as 11.7%, so the threshold for being considered unstable is 14.6% turnover. Higher than this threshold is considered unstable, and below is considered stable.

Productivity

Productivity shows changes in Value Added across industries.

- **Direct Productivity Impact** displays millions of dollars of net revenue change.
- **Total Labor Productivity** is defined as Value Added per worker.
- **Total Labor Productivity Relative to US Average** compares these figures to national trends.

Value Added per worker grows as cost savings is retained as profit or is spent on additional Labor Income which increases Value Added. These gains are calculated into weighted average values for aggregated industries (such as 3-digit NAICS). This may increase or decrease actual productivity depending on the 1) mix of industries, 2) their associated productivity, and 3) the gains in productivity due to travel cost savings.

Pop/Labor

TREDIS calculates the expected impacts on population and the labor force within the study region(s) by year and by industry aggregation. For each region-year report, three panes are available:

- **Labor Statistics** is base information about jobs, labor force, and wages.
- **Population Statistics** is base demographics about population and households.
- **Building Occupancy** Needs shows the change (Alternative – Base Case) in multiple categories.

Benefit-Cost Reports

Graphics

The Benefit-Cost tab starts on the Graphics sub-tab, which shows a chart for the different components of the Benefit-Cost analysis.

The Graphics and Benefit-Cost tabs present three different groupings of benefits with the Societal benefit encompassing total benefits. The following sections explain the benefit groupings and their components in detail.



The Benefit-Cost Graphics Tab

Metrics on the Graphics Tab

The *Graphics* tab shows 3 distinct ways to calculate total benefit and another bar representing costs. **Traveler Benefit** represents benefits to travelers and the businesses that employee them. It is the most narrowly focused of the 3 types of benefit tabulations. **User Benefit** metric includes all the same benefits as Traveler Benefit but also includes Logistics Costs, which represent the cost of managing freight. The **Societal Benefit** tabulation includes all of the Traveler and User Benefits, but also incorporates externalities. See this table for a complete list of categories considered:

Benefit Category	
Business Time & Reliability Cost	
	Traveler Benefit
	X
	User Benefit
	X
	Societal Benefit
	X
Benefit Category	
Value of Personal Time & Reliability	
	Traveler Benefit
	X
	User Benefit
	X
	Societal Benefit
	X
Benefit Category	
Consumer Surplus	
	Traveler Benefit
	X
	User Benefit
	X
	Societal Benefit
	X
Benefit Category	
Vehicle Operating Costs	
	Traveler Benefit
	X
	User Benefit
	X
	Societal Benefit
	X

Benefit Category	
Safety Costs	
	Traveler Benefit
	X
	User Benefit
	X
	Societal Benefit
	X
Benefit Category	
Logistics Costs	
	Traveler Benefit
	User Benefit
	X
	Societal Benefit
	X
Benefit Category	
Business Productivity	
	Traveler Benefit
	User Benefit
	Societal Benefit
	X
Benefit Category	
Social	
	Traveler Benefit
	User Benefit
	Societal Benefit
	X

The **Costs** category in TREDIS represent direct, monetized costs of designing, building, and maintaining infrastructure, summarized in the following categories:

- Construction
- Operations & Maintenance
- Residual

Using the Graphics Tab

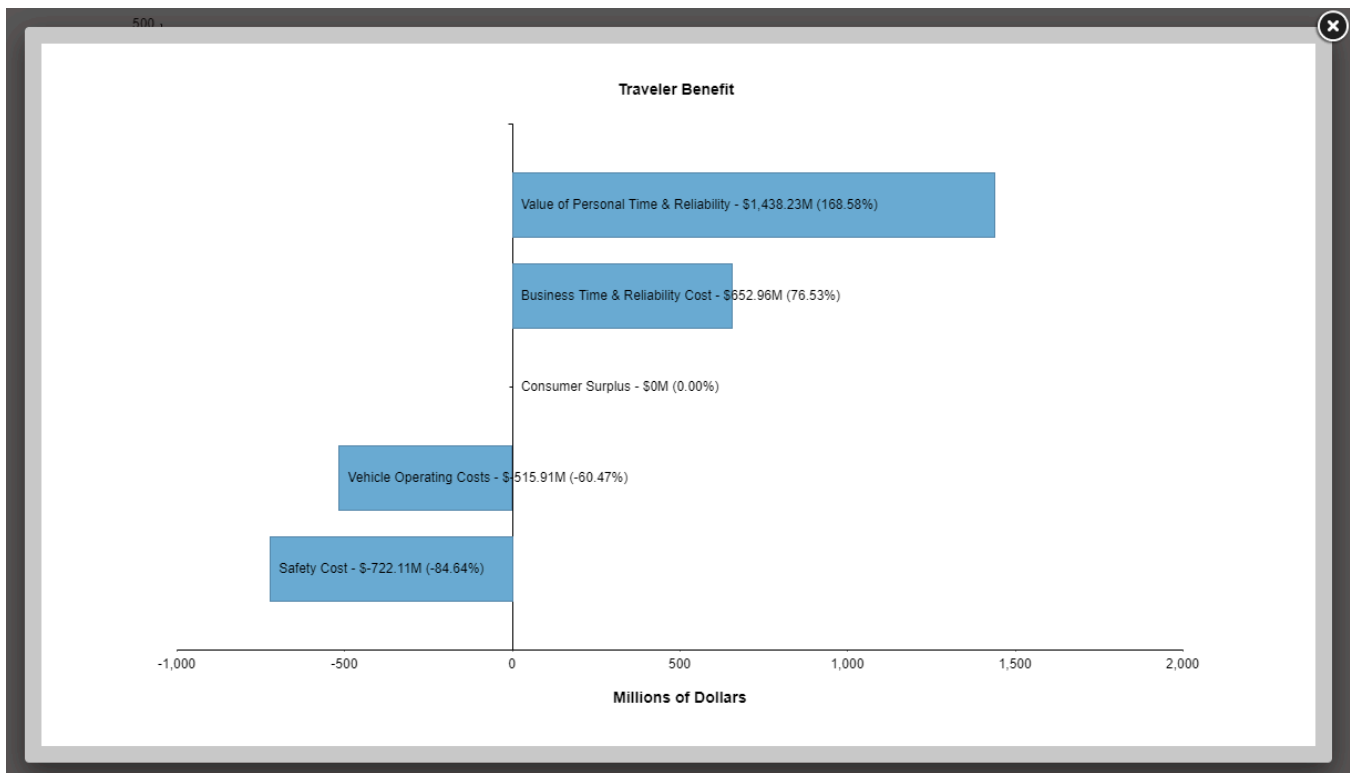
Because Traveler Benefit, User Benefit, and Societal Benefit cover similar categories, you may choose to toggle off one or two benefit bars of the tabulations if they aren't relevant to your analysis.

Toggle on and off metrics by clicking on them in the legend. For example, User Benefit and Societal Benefit may be toggled off to see only Traveler Benefit and Costs.



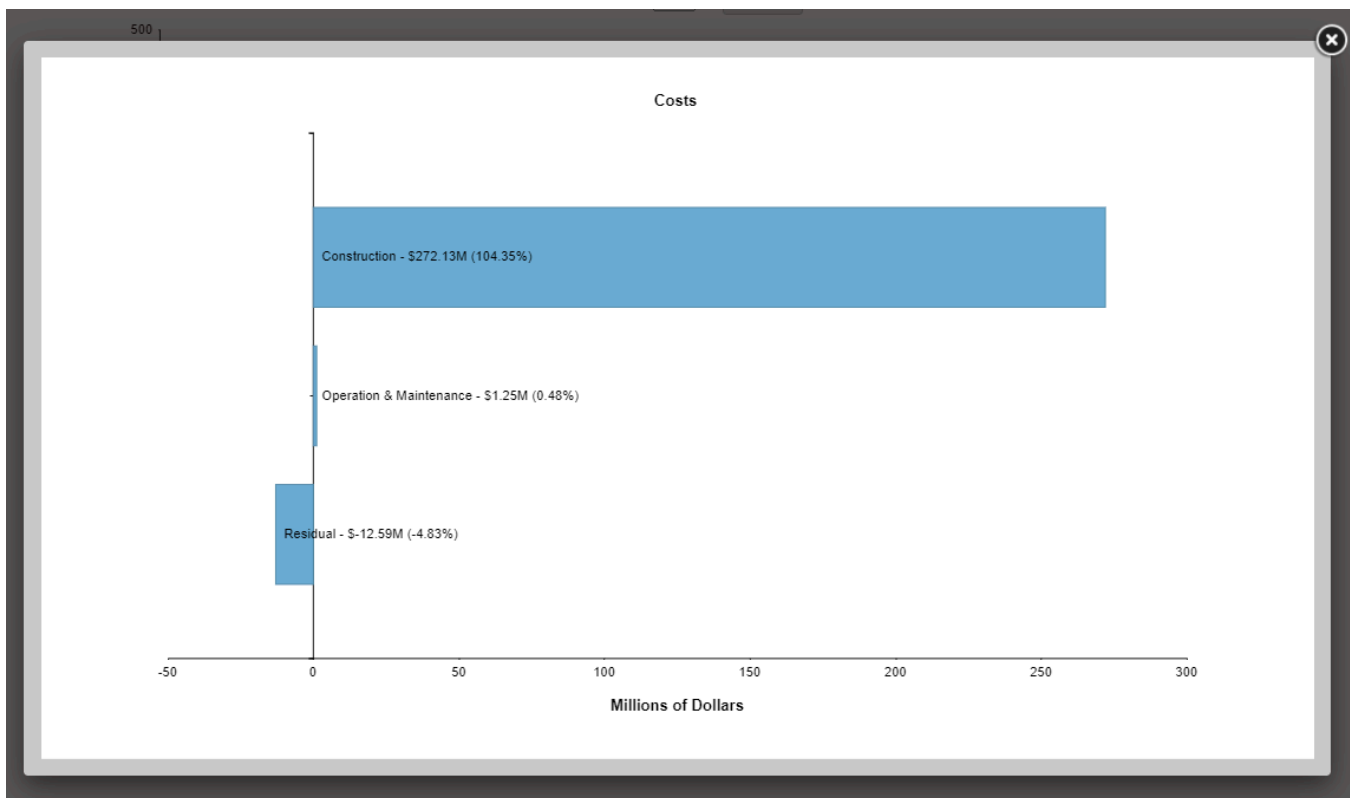
The Chart with User and Societal Benefit Toggled Off

Clicking on a Benefit bar on the chart reveals brings up a new graphic detailing that disaggregates the benefit by the included categories. Clicking on the Traveler Benefit bar above, for example, shows the breakdown between categories.



Details from the Traveler Benefit Bar

Finally, click on the Costs bar to reveal a disaggregation by Costs categories.



Details from the Costs Bar

You may also update the Discount Rate and click Refresh to change the discount rate for all measures.



Highlight of the Discount Rate Control

Benefit-Cost Overview

The Benefit-Cost Overview report shows a tabulation of Benefit-Cost Analysis results for the discount rates selected in Results settings. As with all similar tables, clicking the blue arrow on the left expands the selected category.

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Freight VIA			
Graphics Benefit-Cost Overview Value of Benefits Cost and Net Benefits Environmental Grant Report Performance Metrics			
Benefit-Cost Overview			
Category		3% discount rate (\$M)	7% discount rate (\$M)
Present Value of Benefit Stream		767.892	383.037
Travel Benefits		853.170	431.896
Value of Consumer Surplus From Induced New Activity		0.000	0.000
Value of Improved Travel Time Reliability		1,045.433	586.613
Value of In-Vehicle Travel Time (IVTT)		1,045.763	557.786
Value of Out-of-Vehicle Travel Time (OVTT)		0.000	0.000
Value of Safety Improvement		-722.118	-415.349
Value of Vehicle Operating Cost (VOC)		-515.907	-297.153
Environmental and Social Benefits		-102.087	-57.823
Wider Economic (Productivity) Benefits		16.809	8.964
Transfer Benefit Effects (net benefit adjustment)		0.000	0.000
Present Value of Cost Stream		260.799	217.541
Project Costs		273.387	221.873
Cost Adjustments		-12.588	-4.332
Net Benefit (Benefits - Costs)			
Transportation System Efficiency - Traveler Benefits Only		592.371	214.355
Traditional BCA - Traveler Benefits + Environmental Benefits		490.284	156.532
Full Societal BCA - All Benefit Categories		507.093	165.496
Benefit Cost Ratio (Benefits / Costs)			
Transportation System Efficiency - Traveler Benefits Only		3.271	1.985
Traditional BCA - Traveler Benefits + Environmental Benefits		2.880	1.720
Full Societal BCA - All Benefit Categories		2.944	1.761

Benefit-Cost Overview Report

All values are in present values (discounted) terms, in millions of dollars.

The section for **Present Value of Benefits Stream** drills down into the various categories of net benefits that a project or policy change can bring about.

- **Benefit Stream – Travel Benefits** are associated with travelers and traveling, including categories for time savings and safety as well as vehicle operating costs.
- **Benefit Stream – Environmental and Social Benefits** are associated with environmental effects, greenhouse gas production, and other social benefits as defined by user.
- **Benefit Stream – Wider Economic Benefits** are benefits associated strictly with business productivity, labor market participation, and logistics and supply chain savings.
- **Benefit Stream – Transfer Benefit Effects** specifically deal with adjustments due to fees, for example fees, tolls, or other user charges.

The section on **Present Value of Costs Stream** details accounting for Project Costs and Cost Adjustments.

- **Costs Stream – Project Costs** represent actual design, capital spending, and operational and ongoing maintenance costs associated with the project.
- **Costs Stream – Cost Adjustments** are often residual values of capital, following its use for the project.

The **Net Benefit** section presents 3 categories of summary statistics for the BCA.

- **Transportation System Efficiency: Traveler Benefits Only** is *Traveler Benefit* minus *Present Value of Costs Stream*.

- **Traditional BCA: Traveler Benefit + Economic Benefits** is *Traveler Benefit plus Wider Economic Benefit* minus *Present Value of Costs Stream*.
- **Full Societal BCA: All Benefits Categories** is *Traveler Benefit plus Wider Economic Benefit* plus *Environmental and Social Benefit* minus *Present Value of Costs Stream*.

Benefit Cost Ratio shows 3 ways to calculate Benefit-Cost Ratios.

Value of Benefits

This report shows the benefit values by type by year for two different discount rate, or undiscounted. These categories are the same as presented in the Graphics tab, but grouped A through E, depending on the type and whether the benefit is monetized or non-monetized.

The left tab provides aggregations by year while the right tab provides aggregations by mode-purpose. You may dynamically set the discount rate with the drop down.

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Freight VIA										
choose a discount rate		select aggregation dimension								
Value of Benefit Stream by Year		Value of Benefit Stream by Mode								
3% Discount Rate				Value of Benefit Stream by Year - 3% Discount Rate (\$M)						
Data Year	(A) Traveler Benefits (\$M)		(B) Traveler Benefits (non-\$M)			(C) Shipper/Logistics Cost (\$)	(D) Business Productivity (\$)	(E) Social/ Environ. (non-\$)	Total Benefits	
	Vehicle Operating Costs	Business Time & Reliability Costs	Value of Personal Time & Reliability	Safety Cost	Additional Consumer Surplus					
2028	-47.4	46.6	97.8	-65.8	0.0	1.0	0.0	-8.4	24.0	
2029	-44.5	44.8	94.5	-61.8	0.0	1.0	0.0	-8.0	26.0	
2030	-41.7	43.0	91.2	-58.0	0.0	0.9	0.0	-7.6	27.9	
2031	-39.0	41.3	87.9	-54.3	0.0	0.9	0.0	-7.2	29.7	
2032	-36.4	39.6	84.8	-50.8	0.0	0.9	0.0	-6.9	31.3	
2033	-34.0	38.0	81.7	-47.4	0.0	0.9	0.0	-6.5	32.8	
2034	-31.6	36.4	78.7	-44.1	0.0	0.9	0.0	-6.1	34.1	
2035	-29.3	34.8	75.8	-41.0	0.0	0.8	0.0	-5.8	35.4	
2036	-27.1	33.3	72.9	-38.0	0.0	0.8	0.0	-5.4	36.5	
2037	-25.0	31.8	70.1	-35.1	0.0	0.8	0.0	-5.1	37.5	
2038	-23.0	30.4	67.3	-32.3	0.0	0.8	0.0	-4.8	38.4	
2039	-21.1	29.0	64.7	-29.6	0.0	0.8	0.0	-4.4	39.2	
2040	-19.3	27.6	62.0	-27.1	0.0	0.8	0.0	-4.1	39.9	
2041	-17.5	26.3	59.5	-24.7	0.0	0.7	0.0	-3.8	40.6	
2042	-15.8	25.0	57.0	-22.3	0.0	0.7	0.0	-3.5	41.1	
2043	-14.2	23.8	54.5	-20.1	0.0	0.7	0.0	-3.2	41.6	
2044	-12.6	22.5	52.1	-17.9	0.0	0.7	0.0	-2.9	41.9	
2045	-11.2	21.3	49.8	-15.9	0.0	0.7	0.0	-2.6	42.2	
2046	-9.7	20.2	47.5	-13.9	0.0	0.7	0.0	-2.3	42.5	
2047	-8.4	19.0	45.3	-12.0	0.0	0.6	0.0	-2.0	42.6	
2048	-7.1	17.9	43.1	-10.2	0.0	0.6	0.0	-1.7	42.7	
Total	-515.9	653.0	1,438.2	-722.1	0.0	16.8	0.0	-102.1	767.9	

The Value of Benefits Report

Monetized benefits include expenditures or savings on vehicle operating costs, and represent actual money transfers. Whereas externalities (safety and the environment) are monetized to capture the full range of benefits, even though these benefits only represent an approximate measure of value.

For example, vehicle operating costs include user expenditures on fuel, maintenance (tires, brakes, etc.), and vehicle depreciation per mile. On the other hand, reduced commute times benefit users, and are monetized to capture the total benefit to society of the project (relative to the cost), despite no monetary transfer to the commuter.

As elsewhere, keep in mind that benefits may be negative, in which case they're referred to more accurately as "disbenefits."

All figures are in millions of dollars. The categories are monetized unless noted otherwise.

Cost and Net Benefits

The graphs and tables of the Cost and Net Benefits tab show the gradual accumulation of benefits and costs, making it simple to find the year a project breaks even. The default format is a chart, but other formats can be selected via the dropdown menu at top left.

Chart View

The line chart shows the cumulative costs and benefits. Two discount rates are shown by default. Clicking on the metric descriptions in the legend toggles them on or off.



Chart View of Cumulative Costs and Benefits

By toggling off the metrics showing Benefits at 7% and Costs at 7%, we can see just the rates for 3%. Then, hovering over the line for benefits, we can see individual year values.

This is often useful for quickly identifying the year that cumulative benefits overtake cumulative costs.



Isolating the Breakeven Point for a Project

Table Views

Selecting a Discount Rate (or Undiscounted) in the drop-down menu in the upper left corner presents the data as a table.

Data Year	Project Costs				Project Benefits	Net Total Benefits
	Startup Costs	O&M Costs	Residual Value	Total Costs	Total Benefits	
2024	71.1	0.0	0.0	71.1	0.0	-71.1
2025	69.0	0.0	0.0	69.0	0.0	-69.0
2026	67.0	0.0	0.0	67.0	0.0	-67.0
2027	65.0	0.0	0.0	65.0	0.0	-65.0
2028	0.0	0.1	0.0	0.1	24.0	23.9
2029	0.0	0.1	0.0	0.1	26.0	25.9
2030	0.0	0.1	0.0	0.1	27.9	27.8
2031	0.0	0.1	0.0	0.1	29.7	29.6
2032	0.0	0.1	0.0	0.1	31.3	31.2
2033	0.0	0.1	0.0	0.1	32.8	32.7
2034	0.0	0.1	0.0	0.1	34.1	34.1
2035	0.0	0.1	0.0	0.1	35.4	35.3
2036	0.0	0.1	0.0	0.1	36.5	36.4
2037	0.0	0.1	0.0	0.1	37.5	37.4
2038	0.0	0.1	0.0	0.1	38.4	38.4
2039	0.0	0.1	0.0	0.1	39.2	39.2
2040	0.0	0.1	0.0	0.1	39.9	39.9
2041	0.0	0.1	0.0	0.1	40.6	40.5
2042	0.0	0.1	0.0	0.1	41.1	41.1
2043	0.0	0.1	0.0	0.1	41.6	41.5
2044	0.0	0.0	0.0	0.0	41.9	41.9
2045	0.0	0.0	0.0	0.0	42.2	42.2
2046	0.0	0.0	0.0	0.0	42.5	42.4
2047	0.0	0.0	0.0	0.0	42.6	42.6
2048	0.0	0.0	-12.6	-12.5	42.7	42.7
Total	272.1	1.3	-12.6	260.8	767.9	494.5

Table View of Cost and Net Benefits

The **Project Costs** columns show major cost categories.

- **Startup Costs** include the construction, capital, and design costs.
- **O&M Costs** are the recurring costs of yearly operations and maintenance.
- **Residual Value** costs are negative because they return value beyond the analysis horizon, similar to a benefit (e.g. a bridge doesn't disappear at the end of the analysis period and continues to function). This explains why, for example, there is a small drop in cumulative costs in the graph above at the very end of the project, when residual values are accounted for.
- **Total Costs** sums the previous columns.

The **Project Benefits** column summarizes the benefits disaggregated in other reports. The **Net Total Benefits** simply shows *Total Benefits* minus *Total Costs*.

Environmental

Environmental impacts include impacts from volatile organic compounds (VOC), NOx, SO2, particulate matter (PM 2.5), and CO2. TREDIS estimates costs of emissions of PM 2.5, or particulate matter 2.5 microns or smaller.

Reports under the *Environmental* tab show emissions by year in metric tons, the value of emissions by year, and the value of emissions by mode-purpose.

For the value reports, the drop-down menu in the upper left allows you to choose a discount rate.

As with other benefits and savings in TREDIS, the environmental benefit may be negative to represent a disbenefit due to more pollutants.

Grant Report

The *Grant Report* collates information from several sources to facilitate TREDIS reporting for grant applications.

- The **Benefit-Cost Summary** section is drawn from the benefit-cost calculations in the *Graphics* tab.
- The **Project's Impact on Travel Characteristics** section is from the *Tracing/Validation* tab, on the *Change in Travel Characteristics* report. Note these are summed across regions.
- The **Benefit-Cost Results by Year** sections are given for each of the two discount rates chosen in Results Settings (often 7% and 3%).
- The **Environmental Factors** sections are from the equivalent *Environmental* tab reports.
- The **BCA Assumptions** section presents assumptions for the value of time, vehicle operating cost, and environmental costs. You can check this against the *Adjust Mode Factors* window, accessible via the *Modes* page. The values are repeated for Base and Project simply to show they do not change between them; in TREDIS these factors are all the same between the base and project alternatives.
- The **Useful Life** section reiterates defaults (or inputs) from the *Costs* page.

Benefits per Unit

The *Benefits per Unit* report demonstrates the benefits per unit of construction for projects where users have entered data in the *Quantities and Unit Costs* window of the *Costs* page.

Data Year

Cumulative

Discount Rate

7% Discount Rate

Benefit Per Unit Improvement
All benefits in constant 2021 \$M

Facility	Improvement Type	Units	Benefit per Unit
Road	Miles	5	0.086
	Bike/Ped/Access Miles	2	0.216
	Intersections/Crossings	5	0.086
	Bridges	2	0.216
	Transit Stations/Stops	17	0.025
	Other Facilities	7	0.062
	Vehicles	6	0.072
Total Benefits:			0.432

Benefits per Unit Report

- The **Units** column shows the change in the units built between alternatives (Project alternative minus Base alternative).
- The **Benefit per Unit** column shows the total benefits of the project divided by the number of units of changes.

Note: The numbers in this column should not be added together, since the total benefit is used as the dividend in each row. Each row represents how the benefits could be attributed to the improvement as if it were the only

improvement.

Benefit per Trip

The *Benefit per Trip* report shows change in benefits per trip. This is calculated for passenger trips for Personal, Commute, and Business purposes, and calculated for vehicle trips for Freight purposes. When represented as a benefit per trip, it is easier to represent the user experience and understand whether it is improving from the Base to Project alternative.

For these calculations, induced trips' full cost is counted. (Compare with the calculations for Induced Benefit, where only half the benefit is assumed to be enjoyed by consumers, since that calculation is for the user benefit.)

Dropdown menus allow you to change the year calculated (including an option for all years, "Cumulative"), as well as the discount rate.

- **Change in Benefit per Trip** shows whether the benefits per trip are improving in the Project alternative. For example, if the cost per trip is \$3.00 in the Base alternative and \$2.00 in the Project alternative for a mode, the Change in Benefit per Trip would be \$1.00, because each trip enjoys a \$1 in the Project alternative.
- **Change in Trips** shows the change in trips in the Project alternative. This is calculated by subtracting Project trips from Base trips, so a negative number means there are more trips in the Project alternative. For example, if there are 100,000 trips in the Base alternative and 200,000 in the Project alternative, the Change in Trips would be -100,000 to show that trips increased.
- **Change in Total Benefits** shows the change in total benefits in the Project alternative compared to the Base alternative.

Data Year
Discount Rate

Benefit Per Trip
All benefits in constant 2021 \$

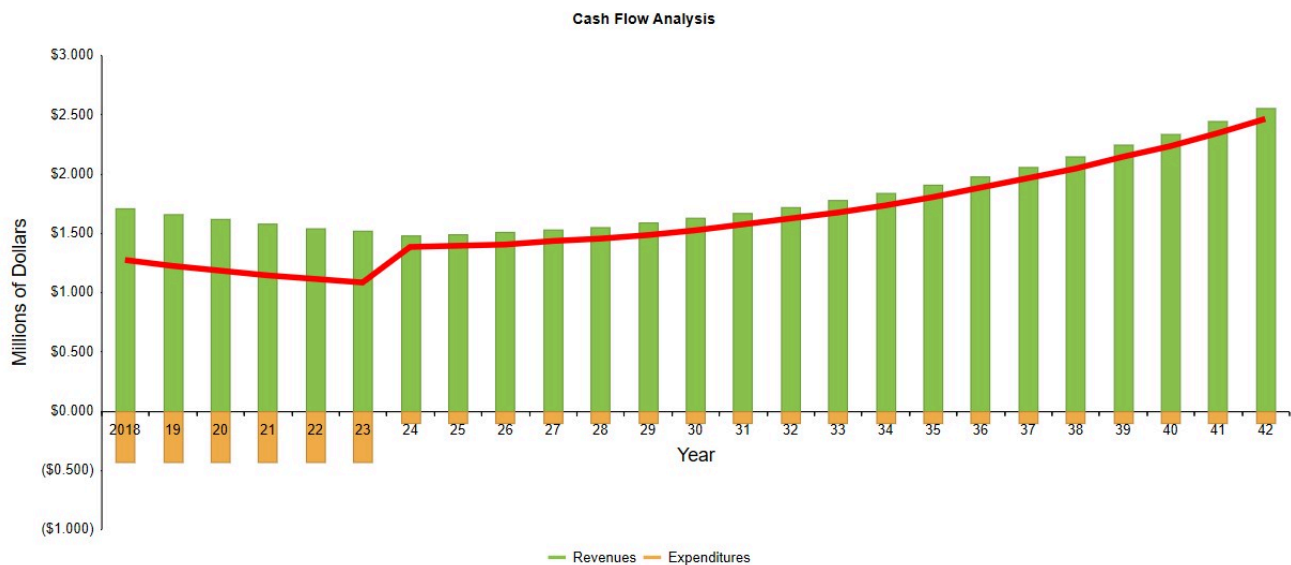
Mode	Change in Benefit per Trip	Change in Trips	Change in Total Benefit
Passenger Car	2.14	-213,936	-1,794,472.76
Light/Medium Duty Truck	-1.49	5,430	-412,409.72
Tractor Trailer Truck	1.53	17,872	1,400,644.43
Bus Rapid Transit (BRT)	-0.05	26,803	668,807.44

Benefit per Trip Report

Financial Impact Reports

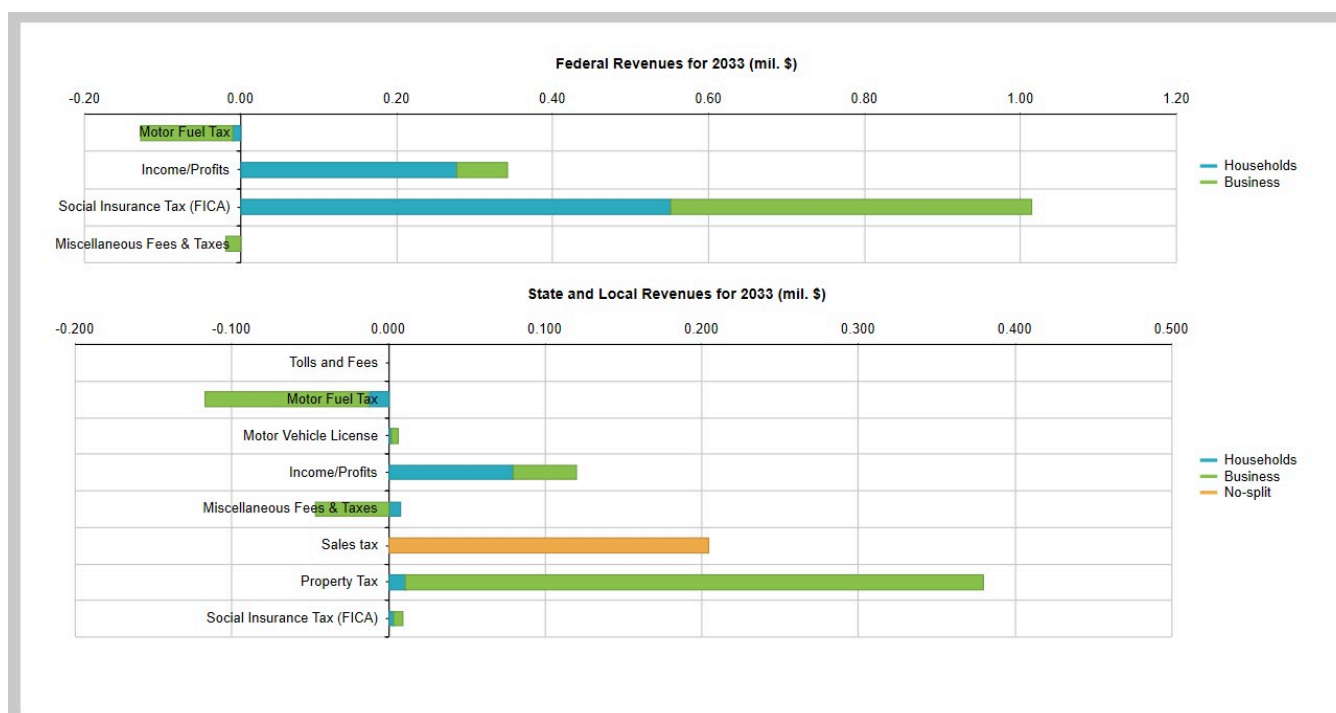
Graphics

The *Financial Impacts* reports open with a summary graphic showing revenues and expenditures as a bar chart, with a line showing the net revenue on a year-by-year basis.



The Graphics Tab

Clicking on a revenue bar shows the detailed breakout of impacts due to federal and state/local taxes, broken out by households and businesses.



Details from the Graphics Report

Likewise, clicking on a cost bar shows the detailed breakout of expenditure impacts for the project.



Breakout of Expenditures

Revenues

Under the *Revenues* tab, select a Region and Year to see projected revenues. Like other matrix tables, clicking the plus or minus sign in the upper left will expand or collapse all rows, and clicking the Excel symbol in the upper right will export the data shown as a spreadsheet that can be saved.

- **Impact Type.** Controls whether you view the total impacts or filter the results to view only construction, operational, contingent development, or market access impacts.
- **Cash Flow.** Selects either with real or nominal dollars for the cash flow.

- **Inflation Rate.** Allow you to change the inflation rate used in your analysis.

Bus Rapid Transit v3

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Freight VIA

Graphics Revenues Cost & Revenue Sharing

Impact Type Total Impact

Revenues (\$M)

Region Name	Households*	Businesses*	Total	
▼ Boston Metro Area	450.7	345.5	858.5	
Data Year	Households*	Businesses*	Total	
> 2024	15.61	11.92	29.58	
> 2025	15.61	11.92	29.58	
> 2026	15.61	11.92	29.58	
> 2027	15.61	11.92	29.58	
> 2028	17.16	13.27	32.86	
▼ 2029	17.29	13.35	33.09	
Tax/Fee Collector	Tax/Fee Description	Households*	Businesses*	Total
Facility or Service Operator	Tolls and Fees	8.950	8.950	17.900
Federal Government	Motor Fuel Tax	-0.784	-0.198	-0.982
	Income/Profits	2.743	-3.379	-0.636
	Social Insurance Tax (FICA)	5.790	5.261	11.051
	Miscellaneous Fees & Taxes	0.000	0.897	0.897
	Total Federal Government	7.748	2.581	10.330
State and Local Government	Motor Fuel Tax	-1.176	-0.228	-1.404
	Motor Vehicle License	0.018	0.055	0.073
	Income/Profits	0.784	-2.143	-1.359
	Miscellaneous Fees & Taxes	0.074	0.363	0.437
	Sales Tax	NA	NA	2.448
	Property Tax	0.851	3.705	4.555
	Social Insurance Tax (FICA)	0.040	0.070	0.110
	Total State and Local Government	0.590	1.822	4.860
> 2030		17.42	13.44	33.32
> 2031		17.54	13.53	33.55

The Revenues Report

Note that Sales Tax is NA under the Household and Business disaggregate columns because the foundational IMPLAN data underlying TREDIS calculations does not provide the incidence split between the two entities.

Cost and Revenue Sharing

Bus Rapid Transit v3

Summary Economic Impact Benefit - Cost **Financial Impact** Tracing / Validation Freight VIA

Graphics Revenues **Cost & Revenue Sharing**

Cost & Revenue Sharing (\$M)

Category	Cost or Revenue Description	Government	Private	Totals
Project Costs	PV of Capital Costs	-671	0	-671
	PV of Operational Costs	-3	0	-3
	PV of Maintenance Costs	-1	0	-1
	PV of Lease Costs	0	0	0
	PV of All Costs	-675	0	-675
Project Revenues	PV of Toll Revenues	126	0	126
	PV of Lease/Contract Revenues	0	0	0
	PV of ALL Revenues	126	0	126
Revenue to Cost Metrics	Undiscounted Payback Period		2024	
	Discounted Payback Period		2024	
	Internal Rate of Return	0	0	0
	Revenue Cost Ratio	0	0	0

The Cost and Revenue Sharing Report

Undiscounted Payback Period and Discounted Payback Period show the year that cumulative revenues top cumulative costs. Discounts here are the first discount rate specified on the *Results Settings* page.

Tracing/Validation Reports

Tracing/Validation reports are designed to support understanding and tracing of TREDIS results to better understand the results reflected in the Benefit-Cost, Economic Impact, and other report suites.

Many report under the *Tracing/Validation* tab provide filter controls using dropdown menus:

- **Economic Activity** adjusts the results view to look at the comparison between project versus base, the base results, or the project results.
- **Periods** filters your results for specific periods from your analysis as set on the *Timing* page.
- **Segments** filters results by the travel segments defined on the *Timing* page.
- **Industry Aggregation** adjusts the industry details viewed in the results. The larger the number of sectors the longer the report. It is recommended to use the smallest value first and then change the settings as desired to zoom in on the industry detail desired. |
- **Impact Type** filters the results by source of impact (or total): construction, O&M, operations, contingent development, or market access.

Not all controls are available on each report.

Graphics

The *Graphics* tab shows a summary of the travel changes in your project. Click on a metric in the legend to toggle it on or off.



Tracing-Validation Graphics Tab

In the following descriptions, the cost savings in the variable described are reported, not the level itself. So, for example, the Crew Cost line item doesn't describe the costs of the crew in the Base or Project alternative. The Crew Cost line item is the difference (Base minus Project) between the two alternatives.

Overview of Travel

The *Overview of Travel* report shows primary measures of performance, including miles per trip, minutes per trip, speed, and fraction of miles traveled in congestion.

The dropdown controls at the top left include a *Breakdown* and a *Perspective* dropdown. The Breakdown options include **By Purpose** and **By Mode**, while the Perspective options include **Vehicle** or **Passenger/Ton Changes** in performance metrics between the Base and Project scenarios by year.

Economic Activity

Breakdown

Perspective

Data Year

Overview of Travel Characteristics

Purpose	Total Trips	Total Miles	Total Hours	Trip Length (Miles)	Trip Time (Minutes)	Speed (MPH)	Fraction of Miles in Congestion
Business	3,594	559,869	12,980	0.5	0.5	0.4	-0.003
Region Name	Total Trips	Total Miles	Total Hours	Trip Length (Miles)	Trip Time (Minutes)	Speed (MPH)	Fraction of Miles in Congestion
External Region	0	0	0	0.0	0.0	0.0	0.000
Wayne County	43,320	196,522	46,524	-0.4	0.2	-0.4	-0.002
Segment	Total Trips	Total Miles	Total Hours	Trip Length (Miles)	Trip Time (Minutes)	Speed (MPH)	Fraction of Miles in Congestion
Morning	4,053	62,301	-35,245	0.1	-9.2	1.4	-0.002
Afternoon	39,267	134,221	81,769	-1.0	8.9	-2.5	-0.003
Ingham County	-39,726	363,348	-33,544	1.5	0.6	1.5	-0.003
Commute	-172,179	-1,435,892	-70,212	0.2	5.6	-0.7	-0.008
Personal	-18,548	625,093	13,154	0.8	1.8	0.5	-0.003
Freight	184,150	951,844	359,857	0.3	-0.8	0.4	0.000

Overview of Travel Report

Change in Project Costs

The *Change in Project Costs* shows calculated differences between project costs by facility type, year, and subcategory of cost.

Change in Travel Characteristics

The *Change in Travel Characteristics* report shows performance metrics.

Clicking on a year expands the table to show the changes in travel characteristics for each mode-purpose combination for that year. This report is helpful to verify that you have entered in your travel data correctly.

Positive numbers indicate savings in trips, mileage, or time saved. That is, the level of the Project alternative is less than the level of the Base alternative. Negative numbers in this report indicate dissavings of these, i.e., an increase in activity.

Cost Savings by Type

Cost savings by mode-purpose combination and type.

To see how the cost savings are allocated across each cost category, click on a specific year. In this expanded view, you can which cost elements are the primary sources of savings in the selected year.

Cost Savings by Type Report

Passenger Cost (In Vehicle). Value of time of passengers for time spent in a vehicle.

Passenger Cost (Out of Vehicle). Value of time of passengers for time spent outside the vehicle.

Crew Cost. Value of time for drivers or other vehicle crew.

Freight Cost. Cost of freight goods being transported. This field is deprecated and set to 0 for results run as of March 2021; for projects run previously, it will maintain the previous cost estimated until the project has results run again.

Freight Cost (Reliability). Costs due to addressing unreliability in goods movements that are passed on to shippers and receivers of freight.

Freight Cost (Delay). Costs due to delay in delivery of goods that is passed on to shippers and receivers of freight.

Reliability Cost. Value of time for passengers and crew spent buffering trips in order to arrive on time under unreliability circumstances.

Fuel Cost w/Taxes. Costs, including taxes, of fuel.

Veh O&M Cost. Operations and maintenance costs of vehicles, not including fuel.

Fee per Vehicle Trip. Charges and- fees incurred on a trip basis (e.g., road tolls, parking).

Fee per Passenger Trip. Charges and fees incurred on a passenger trip basis (e.g., transit or taxi fares).

Fee per Passenger Mile. Charges and fees incurred on a passenger mile basis (e.g., transit or taxi fares).

Fee per Vehicle Mile. Charges and fees incurred on a vehicle mile basis (e.g., mileage-based fees).

Safety Cost. Societal benefits (or disbenefits) from averted fatalities, injuries, and property damage.

Environmental Cost. Societal benefits (or disbenefits) from averted emissions, including GHGs.

Note that the Safety Cost reported here is a societal benefit, and not the same figure as the Safety impacts reported on the Project Impacts by Industry report. (Those are completely economic benefits and are calculated in a separate procedure.)

Cost Savings by Industry

Savings (as shown in *Costs Savings by Type*) by industry and special aggregate groups (e.g., household).

Positive numbers indicate savings in dollars or time valued in dollars. That is, the level of the Project alternative is less than the level of the Base alternative. Negative numbers in this report indicate dissavings of these, i.e., an increase in money spent (or time valued in dollars).

The bulk of the line items in this report show how savings go to specific industries, defined by NAICS code.

- If you choose the highest degree of detail in the Industry Aggregation dropdown, reporting will not correspond directly to a NAICS code.
- Non-industry sectors defined by IMPLAN have descriptions beginning with “Not an Industry”.
- Government sectors defined by IMPLAN have descriptions beginning “Employment and payroll of...”.
- **Household Value of Time Benefit** is time savings, monetized.
- **Societal & Environmental Benefits** are monetized.
- **Transit Operating Expenses** are not used in the benefit-cost analysis or economic model because they are typically assumed to be entered as spending input on the *Costs* page.

Project Impacts by Industry

Savings here serve as inputs into the economic model and reflected, finally, in the Economic Impact reports (*Results* page on the *Economic Impact* tab).

Positive numbers indicate savings in dollars or time valued in dollars. That is, the level of the Project alternative is less than the level of the Base alternative. Negative numbers in this report indicate dissavings of these, i.e., an increase in money spent (or time valued in dollars).

Impacts are summarized by columns describing their source. based on four categories of potential impact sources.

Travel Cost Savings are produced by changes between Base and Project alternatives entered on the Travel page. These might include savings for households and industries through a variety of mechanisms including savings of time on business travel, fuel, and vehicle operating costs. These do not include economic impacts of averted crashes, fatalities, and injuries, which are tallied under the Safety column.

Contingent Development impacts are produced directly by items entered on the Contingent Development tab of the Access page. These represent impacts that might accrue due to considerations outside of a travel model, such as the establishment of a new business venture due to improved travel.

Additional Potential Output from Market Access comes from the Intercity Access tab of the Access page. These include productivity improvements stemming from enhanced employment opportunities, business-to-business opportunities, and port efficiency.

Safety impacts are produced by improved economic outcomes from averted fatalities, injuries, and property damage, including reallocation of medical care costs back to payees (both firms and households), lost productivity due to injury, and insurance costs. Impacts listed here are for economic impact purposes and not for societal benefit calculations — those figures are shown in the *Cost Savings by Type* report.

Reallocated items represent a shift of dollars, so there will be an equivalent direct effect of the opposite sign in the economic impact model, leading net impacts to only depend on the different industry mixes of the positive and negative effects and the characteristics of those industries in the regional economy. Not *Reallocated* items do not represent a shift of dollars, but a single shock with no balancing direct impact of the opposite sign. Because there is no balancing direct effect going into the economic impact model, the effect will be roughly the amount reported plus the effects of the economic simulation.

Driver Budget (Not Reallocated) represents the net to the drivers of TNCs. This is the same as the Driver Income line from the *Transportation Services Accounting Summary* report.

Household Budget (Reallocated) represents the net to the Household sector, with money reallocated to other sectors to where spending will occur in the economic model. These typically include vehicle operating costs and fuel costs for private travel (or half of commute travel).

Household Budget (Not Reallocated) represents the net to the Household sector, with money not reallocated to other sectors in the economic model, typically because the money is collected by an agency.

Transit Operating Expenses represents the net change of spending on operating transit. These figures are not used in the economic model because they are typically assumed to be entered (and impacts determined) by spending input on the *Costs* page.

Market Access Impacts by Source

Impacts of the market access impacts, tracing the effects of inputs on the Access page, Intercity Access tab.

The **Access Characteristics Summary** shows how the inputs are transformed into single metrics expected by the estimation functions and shows the difference between the Base and Project alternatives as a percentage.

To calculate the compound metrics, decay factors are used to weight the population or employment in each band — that is, the additional quantity present in a larger region relative to the next smaller input quantity. For example, if the population within 40 minutes is 1,000,000 and the population within 60 minutes is 1,200,000, the population in the 40-60 minutes band is 200,000.

Local Market (population) is a weighted average of the population bands given in the Access page to represent consumer and labor markets. The measure is:

100% of pop within 40 minutes + 40% of pop 40-60 minutes

Regional Same Day Market (employment) is a metric reflecting improved access to same-day freight deliveries and business relationships. The metric is a ratio where a weighted average of the employment bands is the numerator and the employment within one hour of the county center is the denominator:

(100% of 1- to 2-hr employment + 85% of 2- to 3-hr employment + 15% of 3- to 4-hr employment) / 0- to 1-hr employment

A separate ratio using the population inputs is used to calculate access to population that affects visitor services industries.

Gross Business Attraction from Market Access Improvement shows nominal dollar impacts, broken down by source of market access impact for the last year of operations modeled. These changes are split between productivity changes and business attraction (as higher local productivity leads to relocation of business from other locations).

Market Access Impacts by Industry

These represent direct economic impacts from the section on Gross Business Attraction from Market Access Improvement in the *Market Access Impacts by Source* report, spread across all operations years and broken down by industry.

Impacts depend on the industry mix and scale for the County of Focus for each Region modeled, not for the entire Region.

Intercity Access impacts phase in over time as the local economy reacts to accessibility changes. This leads to much smaller impacts in early operation years.

Transportation Services Accounting Summary

Accounting for revenues, costs, and driver income for TNC modes.

In the example below, TNC operations are expected to collect \$200,000 more in the Project alternative than in the Base alternative.

Equity Reports

The *Equity* reports section provides insight regarding the extent of economic hardship (poverty, low income, high unemployment, lack of car ownership) and historically underserved populations (elderly, physical disability, racial/ethnic minority status) among the study regions. This is expressed in terms of both baseline context and project impact.

Equity Context

The *Equity Context* report shows current baseline conditions for each study region. This includes rates of economic hardship among each region's population (poverty, low income, high unemployment, lack of car ownership) and the percentage shares of historically underserved populations (elderly, physical disability, racial/ethnic minority, non-citizen) living in each region. These measures are compared to state and national figures, so you can see how each region compares to wider area averages. This provides baseline insight for interpreting the impact findings presented in the next tab.

Region Name :				
Default Region				
Measure :	Category :	Region :	State (MA) :	US :
Population		5,243,091	6,873,000	326,569,000
Households		1,994,485	2,646,980	122,354,000
Weighted Median HH Income		\$91,752	\$84,385	\$64,994
Poverty Rate	100% below poverty rate	9.4%	9.8%	12.8%
	150% below poverty rate	14.6%	15.6%	21.7%
	200% below poverty rate	20.1%	21.5%	30.5%
Unemployment Rate		9.1%	9.4%	8.1%
Carless Households		13.1%	12.2%	8.5%
Percent With a Disability		10.8%	11.7%	12.7%
Percent Not a US Citizen		9.0%	7.7%	6.6%
Household Income	Less than \$20,000	11.9%	12.5%	14.1%
	\$20,000 to \$40,000	11.5%	12.7%	17.0%
	\$40,000 to \$60,000	11.0%	11.8%	15.4%
	\$60,000 to \$100,000	19.5%	20.1%	22.5%
	\$100,000 to \$150,000	18.4%	18.0%	15.6%
	\$150,000 or more	27.8%	24.9%	15.4%
Race & Ethnicity	White, Non-Hispanic	68.8%	70.8%	60.1%
	Hispanic or Latino	12.1%	12.0%	18.2%
	Black or African American, Non-Hispanic	7.5%	6.8%	12.2%
	American Indian and Alaska Native, Non-Hispanic	0.1%	0.1%	0.6%
	Asian, Non-Hispanic	8.1%	6.7%	5.6%
	Native Hawaiian and Other Pacific Islander, Non-Hispanic	0.0%	0.0%	0.2%
	Some other race, Non-Hispanic	0.8%	0.8%	0.3%
	Two or more races, Non-Hispanic	2.7%	2.7%	2.8%
Educational Attainment	Less than high school graduate	8.5%	9.0%	11.6%
	High school graduate (includes equivalency)	22.8%	24.1%	27.3%
	Some college or associate's degree	24.1%	25.6%	30.7%
	Bachelor's degree or higher	44.6%	41.3%	30.4%
Age	Under 18 years	20.0%	19.8%	22.4%
	18 to 24 years	10.0%	10.1%	9.3%
	25 to 44 years	27.6%	26.6%	26.6%
	45 to 64 years	26.7%	27.0%	25.6%
	65 years and over	15.6%	16.5%	16.0%

* Source: ACS 2020

The Equity Context Report

Benefit/Impact Distribution

In addition to simply comparing a project's regions directly in terms of their populations, the *Benefit/Impact Distribution* reports show how the benefits and impacts of a project are distributed to the regions, along with some equity measures of interest. In this way, you may quickly see whether the regions that enjoy benefits or impacts are the same regions that may have the greatest need.

Summary

Economic Impact

Benefit - Cost

Financial Impact

Tracing / Validation

Equity

Freight

VIA

Equity Context

Benefit/Impact Distribution

Results Year 2033

Transportation Benefits

Economic Impacts

Reference Levels

Region	Share of Cost (Cumulative)	Analysis Year (2033)			Baseline (2021)					
		Share of Forecast Population	Share of Passenger Savings	Share of Freight Savings	Percent Below 150% of Poverty Threshold	Weighted Median HH Income	Unemployment Rate	Percent With a Disability	Percent Hispanic or Non-White	Percent Carless Households
Region 1	14.0%	61.7%	30.0%	30.0%	22.5%	\$67,297	6.5%	13.8%	40.4%	9.1%
Region 2	17.0%	14.1%	25.0%	25.0%	16.1%	\$79,201	4.4%	10.7%	21.2%	6.0%
Region 3	20.0%	10.3%	20.0%	20.0%	23.9%	\$57,699	5.6%	13.9%	24.1%	8.0%
Region 4	23.0%	5.9%	15.0%	15.0%	20.5%	\$61,062	5.8%	15.1%	19.4%	6.1%
Region 5	26.0%	8.1%	10.0%	10.0%	21.2%	\$62,128	5.0%	13.4%	19.4%	6.6%
Total	100%	100%	100%	100%						

The Equity Benefit-Impact Distribution Report

Transportation Benefits

In this report, the distribution of regional benefits reported under Benefit – Cost reports are presented alongside equity measures.

The *Results Year* dropdown can be used to see specific operations years.

- **Share of Cost (Cumulative).** Percentage of all costs as entered in the *Costs* page, summed across all Construction Years
- **Share of Forecast Population.** Percentage of the forecasted population (in the Base alternative) for the Analysis Year
- **Share of Passenger Savings.** Percentage of total savings experienced by modes with a purpose of Business, Personal, or Commute
- **Share of Freight Savings.** Percentage of total savings experienced by modes with Freight purpose

The columns under the *Baseline* rubric reiterate the equity measures for each region for convenient comparison with shares of savings.

Economic Impacts

Summary

Economic Impact

Benefit - Cost

Financial Impact

Tracing / Validation

Equity

Freight

VIA

Equity Context

Benefit/Impact Distribution

Results Year

2035

Transportation Benefits

Economic Impacts

Reference Levels

Region	Share of Cost (Cumulative)	Analysis Year (2035)					Baseline (2021)					
		Share of Forecast Jobs	Share of Job Impacts	Share of Forecast Income	Share of Income Impact	Percent Below 150% of Poverty Threshold	Weighted Median HH Income	Unemployment Rate	Percent With a Disability	Percent Hispanic or Non-White	Percent Carless Households	
Region 1	14.0%	65.7%	31.1%	66.8%	36.7%	22.5%	\$67,297	6.5%	13.8%	40.4%	9.1%	
Region 2	17.0%	13.2%	21.6%	12.4%	24.3%	16.1%	\$79,201	4.4%	10.7%	21.2%	6.0%	
Region 3	20.0%	9.4%	20.8%	8.4%	16.4%	23.9%	\$57,699	5.6%	13.9%	24.1%	8.0%	
Region 4	23.0%	4.7%	16.7%	4.0%	11.8%	20.5%	\$61,062	5.8%	15.1%	19.4%	6.1%	
Region 5	26.0%	7.1%	9.9%	6.5%	8.9%	21.2%	\$62,128	5.0%	13.4%	19.4%	6.6%	
Total	100%	100%	100%	100%	100%							

The Equity Benefit-Impact Distribution Report,_Economic_Impacts

In this report, the distribution of regional economic impacts reported under Economic Impacts reports are presented alongside equity measures.

The *Results Year* dropdown can be used to see specific operations years.

- **Share of Cost (Cumulative).** Percentage of all costs as entered in the *Costs* page, summed across all Construction Years
- **Share of Forecast Jobs.** Percentage of the jobs (in the Base alternative) for the Analysis Year
- **Share of Job Impacts.** Percentage of the change in total jobs that are an impact of the Project alternative in the Analysis Year
- **Share of Forecast Income.** Percentage of the labor income (in the Base alternative) for the Analysis Year
- **Share of Income Impact.** Percentage of the change in total labor income that is an impact of the Project alternative in the Analysis Year

The columns under the *Baseline* rubric reiterate the equity measures for each region for convenient comparison with shares of savings.

Reference Levels

This report gives context to the *Transportation Benefits* and *Economic Impact* reports by showing the distribution for each of the equity variables of interest among the geographic units analyzed.

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Equity Freight VSA											
Equity Context						Benefit/Impact Distribution					
Results Year 2035						Transportation Benefits Economic Impacts Reference Levels					
Region	Share of Cost (Cumulative)	Analysis Year (2035)				Baseline (2021)					
		Share of Forecast Jobs	Share of Job Impacts	Share of Forecast Income	Share of Income Impact	Percent Below 150% of Poverty Threshold	Weighted Median HH Income	Unemployment Rate	Percent With a Disability	Percent Hispanic or Non-White	Percent Carless Households
Region 1	14.0%	65.7%	31.1%	66.8%	36.7%	22.5%	\$87,297	6.5%	13.8%	40.4%	9.1%
Region 2	17.0%	13.2%	21.6%	12.4%	24.3%	16.1%	\$79,201	4.4%	10.7%	21.2%	6.0%
Region 3	20.0%	9.4%	20.8%	8.4%	16.4%	23.9%	\$57,699	5.8%	13.9%	24.1%	8.0%
Region 4	23.0%	4.7%	16.7%	4.0%	11.8%	20.3%	\$61,082	5.8%	15.1%	19.4%	6.1%
Region 5	26.0%	7.1%	9.9%	6.5%	8.9%	21.2%	\$62,118	5.0%	13.4%	19.4%	6.8%
Total	100%	100%	100%	100%	100%						

The Equity Benefit-Impact Distribution, _Reference_ Levels

The Measures shown for the Modeled Regions take each Region defined in the model as an observation. The State and National geographies take each county in the state or the US as the unit of observation.

For each equity measure, three measures are shown:

- **Top 20th.** The cutoff point above which 20% of regions or counties have higher levels of the observed statistic
- **Median.** The median observation for the statistic
- **Bottom 20th.** The cutoff point below which 20% of regions or counties have lower levels of the observed statistic

In any of the other Equity reports, you can see that Region 1 has an unemployment rate of 6.5%. From the points shown in the Reference Levels for top 20th, median, and bottom 20th – 5.8%, 5.6%, and 5.0%, respectively – you can see that 6.5% is relatively high among the regions modeled for this project.

However, within the State, Region 1 ranks somewhat better, since among all the states' counties, 7.5% is the cutoff for the top 20th. Region 1's 6.5% unemployment rate is below that and thus better than at least 20% of the counties in the state (assuming Region 1 doesn't include any of those counties).

Nationally, however, Region 1 would still be higher than 80% of counties, which we can say because the top 20th percentile is only 5.9% for all counties in the US for the data from year 2021 in this example.

Freight Reports

Once the Freight Analysis has finished running, you will be left at the Summary Results screen. Press the Freight tab to view your freight results.

The reports are available for both Transearch-enabled and vFreight-enhanced licenses, though the modes reported on will differ.

Freight Summary

This report is a summary of the total commodity flows by tons or value, depending upon which subtab is selected. Only the years selected on the settings page show values, so if more details are needed, you will need to rerun the freight analysis from the settings screen.



The Summary Report

Clicking on a bar in the graph will bring up a popup window with a line graph showing the composition of freight flows in either tons or value as selected using the tab. Flows are shown as total, inbound (coming into the study region), outbound (exported from the region), internal (origin and destination within the study region), and through (origin and destination are external to the study region). This data is provided in both graphical and tabular formats both allowing for the export of the data.

In a similar manner, if you hover over a data point on a line, you will see the value at that point. Clicking on the data point brings up another popup with the commodity details in both tabular and graphical formats.

Flow by Mode Report

The *Flow by Mode* report presents by mode, the tons of goods, dollar value of those goods, or the number of vehicles used to transport those goods, by year and also flow type (inbound, outbound, etc.).

Example Freight Project

Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Equity Freight VIA

Graphics Flow by Mode Mode - Commodity Mix Trip Lengths Top Locations All Locations Economy Relationships Freight Dependency Market Summary

Flow by Mode by kTons

Region Name	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Multiple	Pipeline	Other
Study Region	686,941	136,002	1,348,154	111,028	639	390	133,263	420,394	207,115	490,518	1,295
Data Year	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Multiple	Pipeline	Other
2026	132,484	25,921	259,598	21,306	120	74	25,614	80,932	39,683	94,715	246
Flow Type	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Multiple	Pipeline	Other
Inbound Domestic	25,341.900	3,873.250	56,879.102	4,930.490	51.473	9.097	5,242.110	18,589.801	17,123.000	44,459.102	0.000
Inbound Foreign	1,422.430	146.523	3,505.530	162.670	5.867	29.907	54.069	6,223.670	925.326	1.097	246.269
Internal	75,686.102	16,097.500	127,692.000	11,690.900	9.156	0.001	10,072.700	29,161.100	923.983	17,673.301	0.000
Outbound Domestic	28,674.400	5,669.690	68,502.297	4,445.380	51.825	5.446	10,152.400	25,056.600	20,297.699	32,486.000	0.000
Outbound Foreign	1,359.120	134.042	3,019.070	76.567	1.758	29.623	92.601	1,900.420	412.799	95.407	0.171
2027	134,229	26,408	262,899	21,602	123	76	25,751	81,901	40,400	94,781	251
2028	136,768	27,073	268,264	22,093	127	78	26,408	83,684	41,268	96,969	258
2029	139,935	27,867	274,965	22,692	132	80	27,263	85,814	42,307	100,146	265
2030	143,525	28,734	282,428	23,335	137	83	28,228	88,064	43,456	103,907	274

The Flow by Mode Report

Mode-Commodity Mix Report

The *Mode-Commodity Mix* report presents by mode, the tons of goods, dollar value of those goods, or the number of vehicles used to transport those goods, by year along with the detail commodities transported.

Mode - Commodity Mix by Vehicle

Region Name	Rail Carload	Rail Intermodal	Rail NEC	Truck Truckload	Truck L-T-L	Truck PVT	Truck NEC	Air	Water	Multiple	Pipeline	Mail	Other
Default Region	52	0	0	4,962	28	9,130	5	0	0		0	0	0
Data Year	Rail Carload	Rail Intermodal	Rail NEC	Truck Truckload	Truck L-T-L	Truck PVT	Truck NEC	Air	Water	Multiple	Pipeline	Mail	Other
2012	12	0	0	1,164	6	2,684	0	0	0		0	0	0
2013	12	0	0	1,206	7	2,712	0	0	0		0	0	0
2014	14	0	0	1,251	7	2,744	0	0	0		0	0	0
2015	1	0	0	125	1	94	0	0	0		0	0	0
Commodity	Rail Carload	Rail Intermodal	Rail NEC	Truck Truckload	Truck L-T-L	Truck PVT	Truck NEC	Air	Water	Multiple	Pipeline	Mail	Other
01 1 - Field Crops	0.000	0.000	0.000	20.000	0.000	36.000	0.000	0.000	0.000		0.000	0.000	0.000
01 2 - Fresh Fruits or Tree Nuts	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
01 3 - Fresh Vegetables	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
01 4 - Livestock or Livestock Prod	0.000	0.000	0.000	32.000	0.000	1.000	0.000	0.000	0.000		0.000	0.000	0.000
01 5 - Poultry or Poultry Products	0.000	0.000	0.000	4.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
01 9 - Misc Farm Products	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000

The Mode-Commodity Mix Report

Trip Lengths Report

The *Trip Lengths* report breaks down the distances the commodities move, again as tons of goods, value of goods, or number of vehicles moving the goods, showing the breakdown in distance ranges, average, and estimated VMT.

Example Freight Project										
Summary Economic Impact Benefit - Cost Financial Impact Tracing / Validation Equity Freight VIA										
Graphics Flow by Mode Mode - Commodity Mix Trip Lengths Top Locations All Locations Economy Relationships Freight Dependency Market Summary										
Trip Lengths by kTons										
Region Name	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Pipeline	Other
Study Region	686,941	136,002	1,348,154	111,028	639	390	133,263	420,394	490,518	1,295
Data Year	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Pipeline	Other
2026	132,484	25,921	259,598	21,306	120	74	25,614	80,932	94,715	246
2027	134,229	26,408	262,899	21,602	123	76	25,751	81,901	94,781	251
Trip Distance	Single Unit Truck	Truck Plus Trailer	Semi Trailer	Double Trailer	Triple Trailer	Air	Water	Rail	Pipeline	Other
0 - 50 Miles	0.075	0.000	0.031	0.000	0.000	0.000	9,744.780	505.227	3,573.040	0.000
51 - 100 Miles	16.562	0.794	13.259	0.520	0.000	0.000	2,428.160	6,452.710	9,421.980	126.315
101 - 200 Miles	95,477.703	19,129.199	155,519.000	14,189.100	16.162	0.776	1,500.720	34,247.898	42,642.801	124.155
201 - 500 Miles	28,981.500	6,205.480	73,047.703	6,610.850	60.776	9.803	4,755.310	22,583.801	32,561.400	0.002
501 + Miles	9,753.180	1,072.360	34,318.898	801.037	46.405	65.122	7,321.920	18,111.400	6,581.610	0.894
Average Miles	229.871	201.567	276.770	208.851	500.436	1,124.220	260.806	345.557	230.118	131.196
Estimated VMT	30,855,300.000	5,322,950.000	72,762,496.000	4,511,500.000	61,725.199	85,105.000	6,716,000.000	28,301,500.000	21,810,700.000	32,978.199
2028	136,768	27,073	268,264	22,093	127	78	26,408	83,684	96,969	258
2029	139,935	27,867	274,965	22,692	132	80	27,263	85,814	100,146	265
2030	143,525	28,734	282,428	23,335	137	83	28,228	88,064	103,907	274

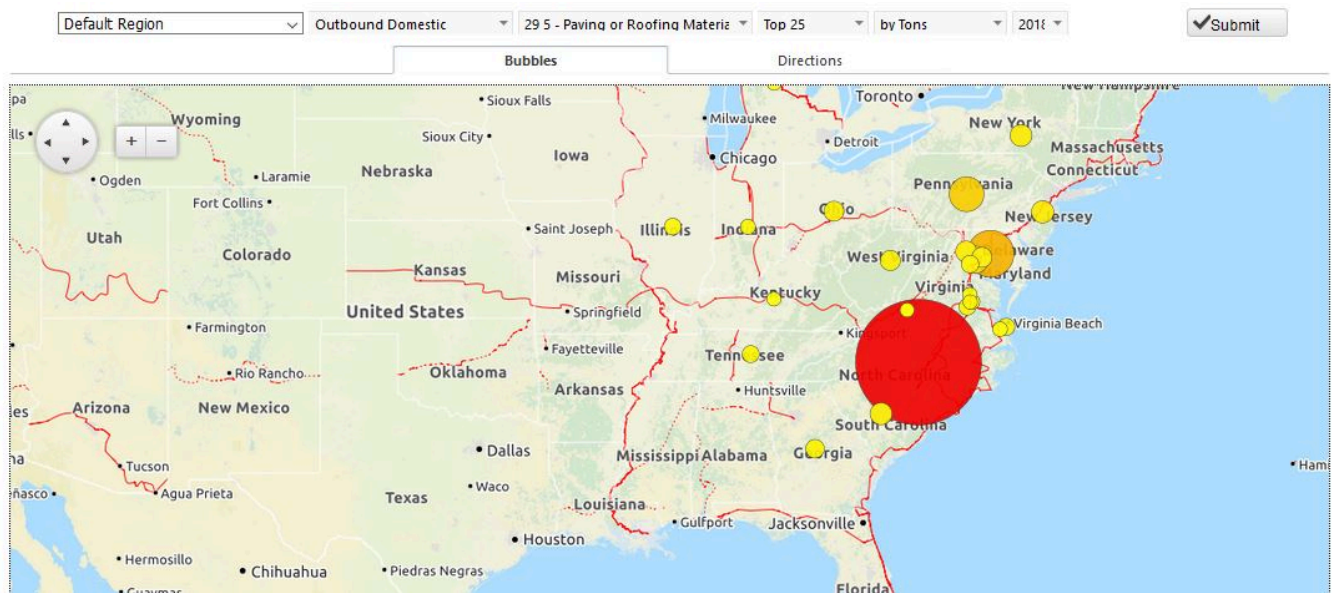
The Trip Lengths Report

Top Locations Report

The *Top Locations* chart presents as either a bubble chart or a direction chart the relative flow of goods (as tons, value, or number vehicles) with the largest/darkest bubbles delineating the largest values and conversely the smallest/lightest bubbles representing the smallest values. The quantities to be presented are selected with the drop down menus for

- Region
- Direction (inbound/outbound, total/domestic/international)
- Commodity of interest (or all commodities)
- Number of data points to show (top 5, 10, 25 (default), 50, 75, or 100)
- Value shown (tons, value, vehicles)
- Year of interest

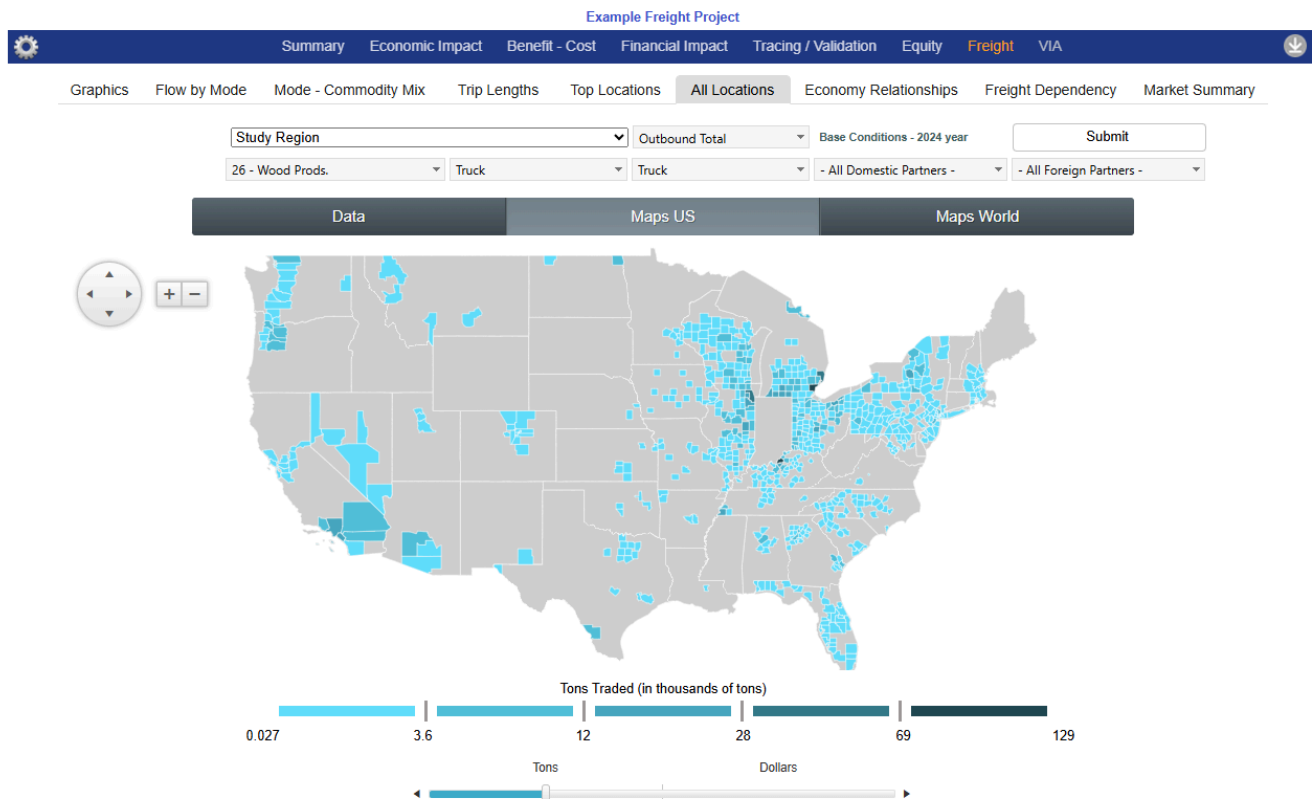
The map below is a representative bubble chart showing top 25 destinations the outbound domestic flow of paving or roofing materials in tons for 2018.



Top Locations Map

All Locations Report

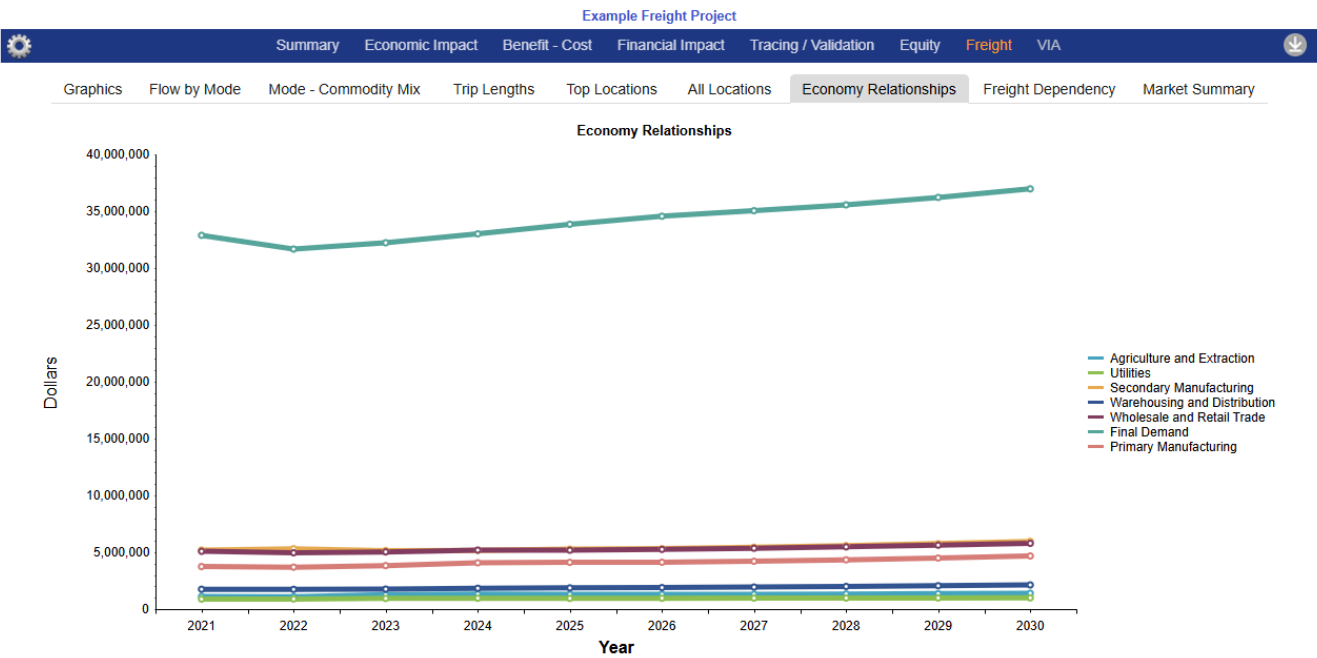
The *All Locations* report provides baseline vFreight data for your study region, based on the settings you select in this tab for commodity flow direction (inbound/outbound domestic/international), commodities to view, domestic mode type, foreign mode type (for international flows), and foreign trade partner. Pressing the submit button processes this baseline data and is presented as a set of tables and maps.



The All Locations Report, Table

Economy Relationships Report

The *Economy Relationships* chart shows the trend for the top 7 commodities transported by value.



The Economy Relationships Report

Freight Dependency Report

The *Freight Dependency* report presents the economic impacts (output, value added, income, and jobs) by industry for the region, direction, modes, commodities, and year selected, with the option to include labor match.



Charts

Table for All Years

Employment Freight Dependence

Year	Industry	Freight Dependent							Non-Freight Dependent	Total
		Rail	Truck	Air	Water	Pipe	Other	Total		
2026	Agriculture & Extraction	2,606	10,883	14	366	493	6	14,366	4,569	18,935
	Utilities	452	137	0	23	1,121	0	1,734	15,732	17,466
	Construction	1,416	11,032	76	148	754	60	13,487	42,263	55,750
	Manufacturing	56,559	255,755	2,815	1,345	14,408	907	331,789	71,852	403,640
	Wholesale Trade	551	2,711	48	9	67	43	3,429	56,799	60,229
	Retail Trade	89	486	3	3	21	9	611	38,089	38,701
	Transportation	181	1,838	8	76	734	16	2,853	23,743	26,596
	Postal & Warehousing	38	394	2	11	106	2	553	11,025	11,577
	Media and Information	334	1,539	24	4	17	16	1,934	22,979	24,913
	Financial Activities	157	1,319	4	19	153	17	1,670	152,144	153,814
	Professional & Business	492	3,036	35	24	127	30	3,744	93,324	97,067
	Education & Health	715	4,759	130	12	63	34	5,713	74,275	79,988
	Other Services	646	5,533	23	20	105	22	6,348	55,739	62,087
	Government	32	232	2	5	62	2	336	42,696	43,032
2027	Agriculture & Extraction	2,606	10,883	14	366	493	6	14,366	4,706	19,072
	Utilities	452	137	0	23	1,121	0	1,734	15,921	17,654
	Construction	1,416	11,032	76	148	754	60	13,487	42,745	56,231
	Manufacturing	56,559	255,755	2,815	1,345	14,408	907	331,789	80,419	412,207
	Wholesale Trade	551	2,711	48	9	67	43	3,429	58,779	62,208
	Retail Trade	89	486	3	3	21	9	611	38,344	38,956
	Transportation	181	1,838	8	76	734	16	2,853	24,442	27,296
	Postal & Warehousing	38	394	2	11	106	2	553	11,397	11,950

The Freight Dependency Report

Glossary

Term

Alternative

Definition

Within a TREDIS project, alternatives such as Base (no-build) and Project (build) are compared

Term

Analysis Type

Definition

TREDIS adapts the user inputs and available results to match where in the transportation planning cycle the user project falls. In addition to the Advanced Mode, TREDIS includes Public Policy, Vision Planning, Prioritization, Alternatives Analysis, Single Project, Existing Facility, and Asset Management Types.

Term

Access

Definition

See Market Access

Term

BCA

Definition

Benefit Cost Analysis. [Click here for detailed explanation](#)

Term

Buffer Time

Definition

Refers to the hours that travelers must set aside for each vehicle trip in addition to their travel time in order to arrive on-time 95% of trips. Average buffer time per trip is related to average travel time per trip by the buffer time index. TREDIS can estimate needed buffer time per trip based on the information you provide on total Trips, total VHT, and percent of VMT congested ($V/C > .9$).

Term

Constant Dollar Year

Definition

The adjusted value of currency used to compare dollar values from one period to another.

Term

Construction Period

Definition

The schedule years when a project's construction activities occur. This period ranges from the Construction Start Year to the Construction End Year

Term

Contingent Development

Definition

Refers to discrete jobs or business sales attracted to the region due to the transportation improvement – the development of this economic activity is contingent on completion of the project. Contingent development within the market access inputs section of TREDIS can be used when the agency has more specific information on land development or job attraction that should be included as well as estimates from transportation cost savings and expansions of the labor market or same day deliver market areas.

Term

Contract

Definition

TREDIS organizes subscriptions using the concept of contracts. The contract contains information about the geographies the user may access and time period the subscription is active.

Term

Costs

Definition

Costs are the project expenditures made during the Construction Period and then the operating and maintenance expenditures during the Operations Period.

Term

Cost Elements:

Definition

Property Acquisition: Right-of-way purchases or easements **Engineering and Design:** Soft costs of construction, including planning, analysis, legal, architectural, engineering, and design work. **Right of Way:** Earthmoving, grading, drainage, and paving. For railroads, this includes all expenditures on the laying of rails; for airports, this includes runway construction. **Transport Structures:** Construction of culverts, road bridges, flyovers, railroad bridges, and marine docks **Terminal:** Operations offices, maintenance facilities, airport/bus/rail terminals, or storage buildings **Vehicles:** Acquisition of rail cars and engines, ferries, airplanes, barges, or maintenance or service vehicles **Ongoing Operations:** Cost related to transit service operation, highway toll collection, systems operation, or incident management **Maintenance and Rehabilitation:** Crack repair, repaving, or vegetation control; also includes vehicle servicing.

Term

CO2

Definition

Carbon Dioxide (pollutants)

Term

Custom Mode

Definition

A custom mode is a user created mode, based on an existing mode which can have different default values. Custom modes are shared among all members of the user's account, with the user who created the custom mode uniquely able to edit the default values.

Term

Direct Impact

Definition

The effect of cost savings to system users under the transportation scenario modeled, or spending by the operator or constructing entity of a project or service.

Term

Discount Rate

Definition

Cost of capital (interest rates). Note: TREDIS uses the default values of 3% and 7%, which corresponds to the values typically used in grant applications, although the user may change these values prior to running the analysis on the Results - Settings screen.

Term

EIA

Definition

Economic Impact Analysis. [Click here for detailed explanation](#)

Term

Environmental Factors

Definition

This deals with emissions generated by the vehicles in the project. Factors include tons of emissions (VOC, SO2, NOX, PM, and CO2) per vehicle mile traveled both free flow and congested, along with the cost per ton of these pollutants.

Term

FIA

Definition

Financial Impact Analysis. [Click here for detailed explanation](#)

Term

Fraction Congested

Definition

Fraction of time all vehicles for a specific mode-purpose are experiencing congestion (values range from 0 - 1.0)

Term

Fraction of Trips: Incoming

Definition

Fraction of trips (0 - 1.0) that originate outside the study region and end in the study region

Term

Fraction of Trips: Internal

Definition

Fraction of trips (0 - 1.0) that originate in the study region and also end in the study region

Term

Fraction of Trips: Outgoing

Definition

Fraction of trips (0 - 1.0) that originate inside the study region and end outside the study region

Term

Fraction of Trips: Through

Definition

Fraction of trips (0 - 1.0) that originate outside the study region and end outside the study region

Term

Indirect Impacts

Definition

The effect of spending by the suppliers to business users benefiting from system improvements, or suppliers of operators or constructing entities of a project or service.

Term
Induced Impacts

Definition
The effect of household spending due to additional employment and payroll generated by direct and indirect impacts.

Term
Labor Income

Definition
Labor Income includes employee compensation and proprietor income. In TREDIS, it represents the additional wages, salaries, and benefits for employees and new income for proprietors from the scenario analyzed.

Term
Labor Market

Definition
The labor market affected by a project is considered to be the number of residents within a 40 minute trip of an employment center affected by the project. TREDIS default labor market values are based on the population within a 40 minute drive-time from the population-weighted centroid of a county. On the Summary graphic, TREDIS shows the percent improvement which you indicated your project is expected to provide.

Term
Linked Area

Definition
Regions directly connected to study region, defaults to geographies within study region, but may be overwritten. (Contact your account manager to add linked areas that are outside your subscribed account regions)

Term
Local Market

Definition
Approximate 40-minute commute time (way). The threshold at which most employees are willing to travel.

Term
Market Access

Definition
Translates changes in market access and intermodal connectivity into effects on agglomeration, dispersion and scale economies for industry sectors. It applies calculation methods backed by peer-reviewed publications for estimating wider economic impacts.

Term
Mode

Definition

Transportation type, such as passenger car, truck, and bus used in the Project analysis

Term
NOX

Definition

Nitric Oxide and Nitrogen Dioxide (pollutants)

Term
Occupational Aggregation

Definition

Refers to the number of digits of Standard Occupational Classification (SOC) codes to use when reporting economic impacts by occupation. The SOC system is developed and published by the U.S. Bureau of Labor Statistics and used for their reporting. TREDIS offers 2-, 3-, and 4-digit SOC Code aggregation.

Term
O & M

Definition

Operations and Maintenance - see Cost Elements for Ongoing Operations, and Maintenance and Rehabilitation.

Term
Operations Period

Definition

The period of time when the transportation system is in operation and is incurring operating and maintenance costs. This period ranges from the Operations Start Year to the Operations End Year.

Term
Output

Definition

Output represents the value of industry production. For manufacturers, this would be sales plus/minus change in inventory. For service sectors production, output is simply the value of sales. For Retail and wholesale trade, output is represented by gross margin and not gross sales. Margin is sales receipts less the cost of goods sold.

Term
Period

Definition

A time period specified at the Project Level, defined solely by its travel demand characteristics. Multiple periods may be used to model differences in peak vs. off-peak or seasonal differences resulting from road closures.

Term
Period Veh-Trips

Definition

The number of one way trips made by all vehicles during the period (annually for example)

Term
PM

Definition

Particulate matter (pollutants) - complex mixture of extremely small particles and liquid droplets in air. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

Term
Productivity

Definition

The average measure of the efficiency of production, which is expressed as the ratio of the outputs to the inputs as used in the production process, i.e. output per unit of input.

Term
Project

Definition

The major unit of a TREDIS analysis defined by certain parameters being held constant. It has the following features: (1) the geography (Region) is constant over the entire analysis, (2) all Alternatives within the Project have the same time horizon (that is, the same Construction Period and Operations Period), and (3) certain parameters such as the discount rate, are "fixed" across Alternatives when they are being compared.

Term
Project Group

Definition

TREDIS allows the user to organize collections of projects in groups. The criteria for organizing is up to the user and may be elements such as user projects, team projects, archived projects (for saving older projects), etc.

Term
Purpose

Definition

Trip purposes are used to classify why a trip is taken and is associated with a mode to form a mode-purpose combination. The trip purposes will fall into one of the following five categories: Business, Personal, Commute, Freight, or No Split (which is the combination of the previous four selections.)

Term
Results Year

Definition

Year used for presenting TREDIS results, typically in the future

Term
Same-Day Market

Definition

Approximate 180-minute (3-hour) drive time for a same day truck delivery of goods. Allows for delivery and truck return to warehouse the same day.

Term
STCC

Definition

The Standard Transportation Commodity Code (STCC) is a publication containing specific product information used on waybills and other shipping documents. A STCC code is a seven digit numeric code representing 38 commodity groupings.

Term
SO₂

Definition

Sulfur Oxides (pollutants)

Term
Study Region

Definition

Geographic areas where the Build Alternative takes place. These study areas may be as small as a zip-code or as large as a collection of states. A project may have 1 or more Regions (up to 10).

Term
Supply Chain

Definition

Refers to the same day delivery market for an employment center modeled by the project. It conversely considers the establishments that can serve your employment center with same day delivers. TREDIS estimates Supply Chains based on the employment at establishments within a 3 hour drive time. Default values for supply chain area employment are based on the employment-weighted centroid of a county. On the Summary graphic, TREDIS shows the percent improvement which you indicated your project is expected to provide.

Term
Terminal

Definition

An intramodal transfer facility such as an airport, marine port, or rail facilities (passenger and freight)

Term
Time/Value Factors

Definition

Default values used by TREDIS to address costs per crew member, passenger, and freight logistics, as well as buffer time costs and out of vehicle transfer costs

Term
Travel Characteristics

Definition

Translates changes in traffic volumes, vehicle occupancy, speed, distance, reliability and safety into direct cost savings for household and business travel. It applies practices for travel modeling and economic valuation that are widely accepted by metropolitan, state and federal agencies.

Term
TREDIS

Definition

Transportation Economic Development Impact System

Term
Truck L-T-L

Definition

Truck L-T-L refers to Less than Truckload shipping. This Mode is used to describe trucks used where a shipment does not require a full 48- or 53-foot trailer. Examples are lift gate and residential pickups and deliveries, etc.

Term

Truck PVT

Definition

Refers to "Private" truck freight.

Term

Truck NEC

Definition

Refers to truck freight "Not Elsewhere Classified."

Term

Useful Life

Definition

The useful life of a facility describes the number of years after which a facility is considered to be obsolete and in need of replacement. TREDIS uses information on the useful life of project investment categories to determine the residual value of those investments at the end of the analysis period. At the completion of construction, investments begin depreciating at a rate tied to the useful life factor.

Term

Value Added

Definition

Value Added changes from a project can also be considered as changes in Gross Regional Product or GDP. Value Added is the difference between an industry's or establishment's total output and the cost of intermediate inputs. It consist of employee compensation, taxes on production and imports less subsidies, and gross operating surplus (similar to profit).

Term

VHT

Definition

Vehicles Hours Travelled

Term

VMT

Definition

Vehicle Miles Travelled

Term

VOC

Definition

Volatile Organic Compounds (pollutants)
