REMI TranSight v5.0

User's Guide

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I. Introduction

This user's guide is intended to serve as a broad overview of the software interface of TranSight version 5.0. Contained within this document are descriptions and screenshots that map out the overall layout of the application and also highlight some of the specific functionality available in different areas of the product.

Integrating economics with travel demand modeling, TranSight dynamically demonstrates how transportation makes economies competitive. Users can test alternative transportation changes and observe the short and long-term impact on jobs, income, population, and other economic variables. TranSight is a sophisticated modeling tool that integrates travel demand models with the REMI model and is constructed with extensive data on emissions, safety valuation factors, and other data.

II. Overview of the Home Window

The main TranSight application window is the initial jumping off point for all analyses performed with the REMI model. This home window is the central location for creating and managing forecasts, changing general settings, making customizations, examining detailed information specific to your model regions, and finding in-software support material. There are six major sections to the home window, each accessible via tiles located on the left-hand side of the screen.

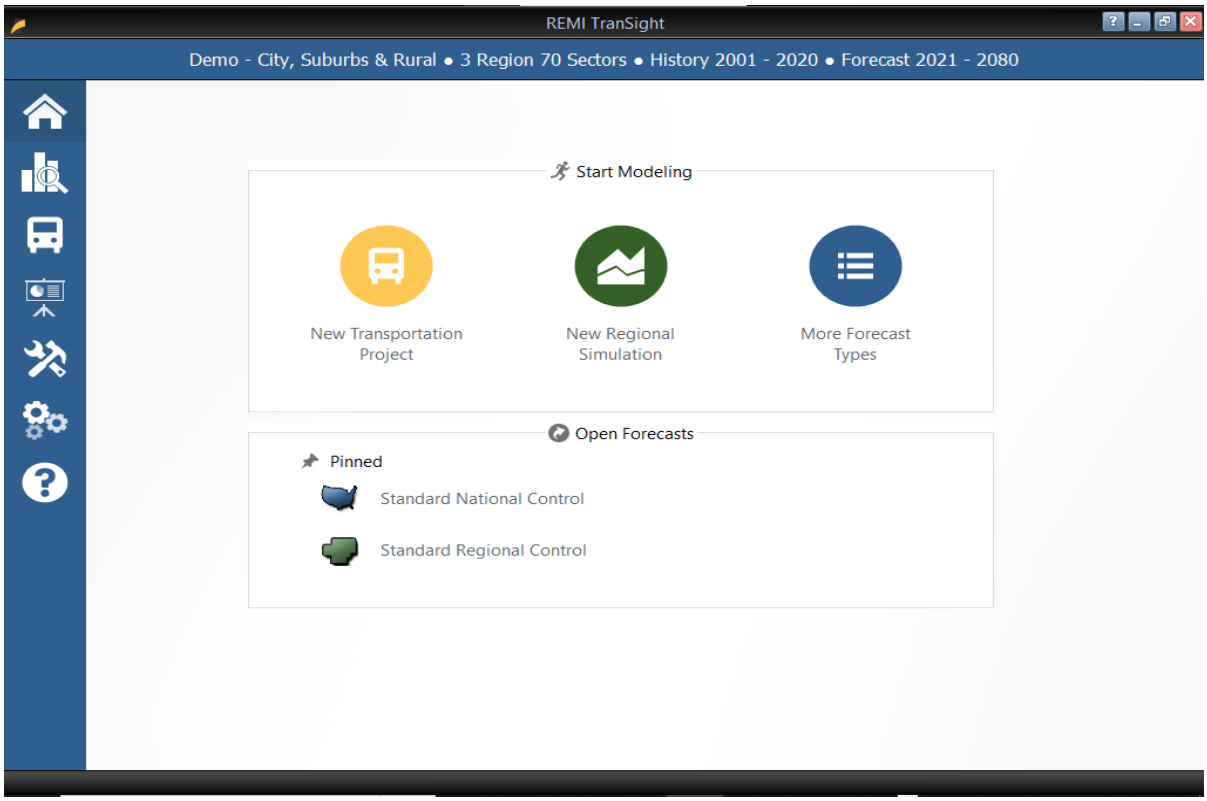


Figure 1: TranSight Home Window

Home Screen

The first section of the home window, which will be the first thing seen once TranSight has finished launching, is the home screen. The home screen's purpose is to provide quick and simple access points for starting your use of the REMI model to simulate policy change. By clicking on the appropriate tile, you are able to start creating any one of the four types of forecasts available in TranSight: regional simulations, national simulations, regional controls, and national controls. In some cases, you may be prompted to choose a baseline for your new forecast from the Forecast List. Your new forecast will open in a separate window, called the Forecast Window.

If you are interested in exploring REMI's default control forecasts that form the basis of your model, you can dig directly into the data by clicking on the pre-made **Regional Forecast** or **National Forecast** tiles under "Open Forecasts". The selected forecast will be opened in a special Forecast Window that shows only the Results section. Some specific tables, maps, and data visualizations have been specially chosen to display REMI's baseline forecasts and provide informative profiles of the national and regional economies.

Another way of examining baseline data and visualizing differences between your model regions is to visit the Regional Profile tool, also accessed from the home screen by clicking on the Model Details button and then the **Regional Economic and Demographic Profiles** tile.

Regional Profile

The **Regional Profile** tool features a combination of a regional map with several tabs of tables and charts describing last-history-year data for major economic and demographic concepts for each region. This tool is useful for learning about the specific economic and demographic characteristics of your model regions. Many of the tables contain location quotients, which make it easy to identify unique regional attributes in comparison to national averages. Additionally, our newly updated map is capable of displaying an internet-based **OpenStreetMaps** layer using the **Map Layers** button, which could prove useful for investigating regional geography.

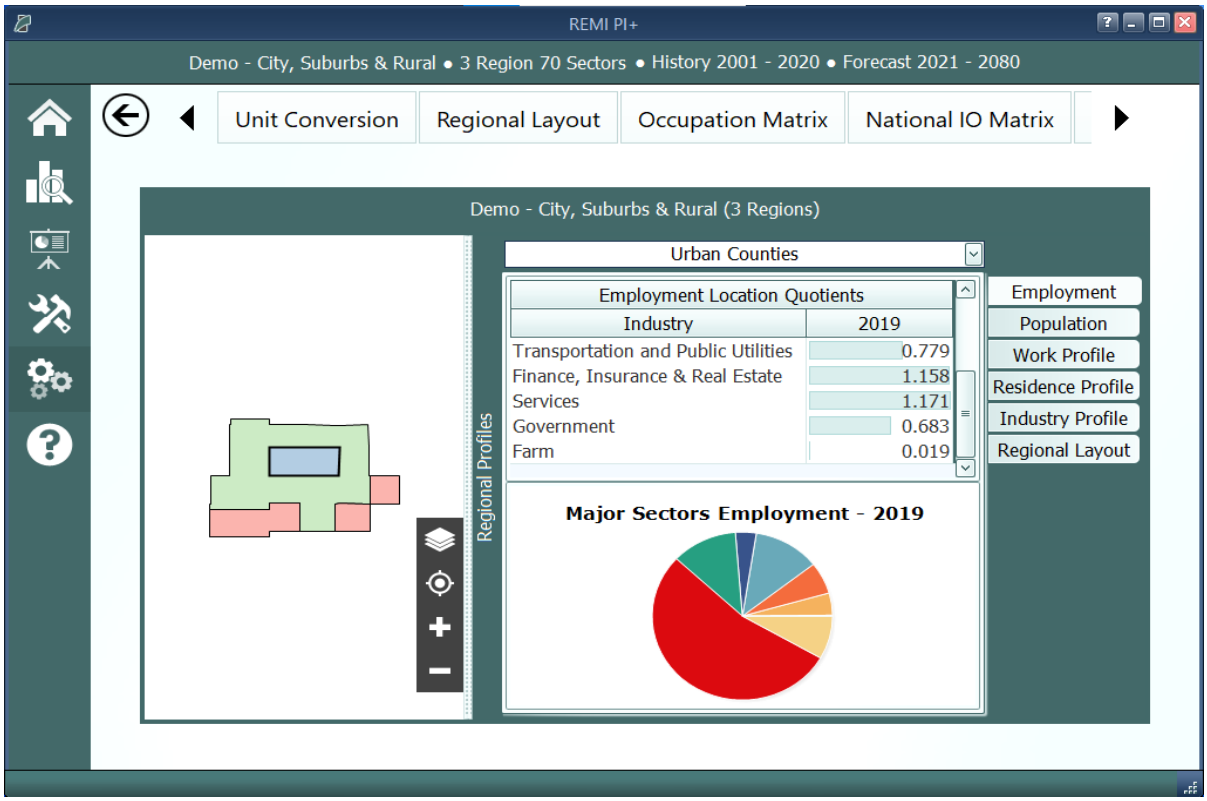


Figure 2: Regional Profile

What's New

The **What's New** tile will open up a new window to show a summary of the latest changes that have been made to TranSight so that you won't miss out on any new features when you get a new version.

Forecast List

The Forecast List, accessed by clicking on the **View Forecasts** tile, is the central location for everything to do with forecast management. The Forecast List will show every forecast you have created with the model. Forecasts are not opened automatically, so a large list of forecasts will not inherently cause any increased operating overhead for TranSight. This also means that if a forecast file does get damaged it will not prevent viewing of other forecasts unless they were dependent on them as a Control.

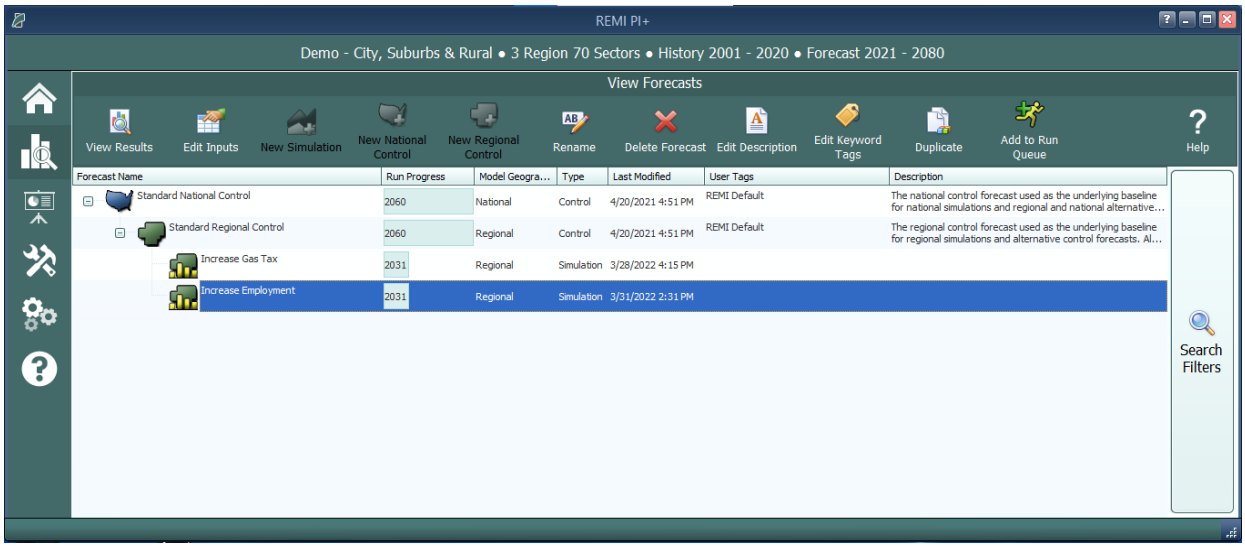


Figure 3: Forecast List

The Forecast List organizes forecasts in a tree structure. Each forecast appears underneath its parent baseline control, with the **Standard National Control** and **Standard Regional Control** at the top. Selecting a forecast in the list will activate buttons above the list depending on the forecast selected and what options are available to it. For control forecasts, buttons for creating new control or simulation forecasts will become active depending on the type of control forecast selected. All forecasts in the list can be opened for viewing in their respective Forecast Window. Depending on whether a forecast being opened already has been run, the Forecast Window will open to either the Inputs List or the Results section.

Other actions that can be taken for forecasts on the Forecast List are renaming, deleting, adding or editing a description, adding or editing keyword tags, and duplicating. Tags and descriptions are new features that should be useful for organizing your forecasts now that they are all contained in the same place. For further ease of use when the forecast list becomes long, there are search filters that can quickly hide all forecasts that you are not currently interested in seeing.

Add To Run Queue

Click on the **Add to Run Queue** button while a forecast is selected to add it to a queue of forecasts that will be run in order. This can be useful if you need to update several forecasts in a larger model that will take a long time without needing to attend to the model during the process. In **Figure 4** below you can see an example of this queue. When you have filled the queue, click the **Start Run** button.

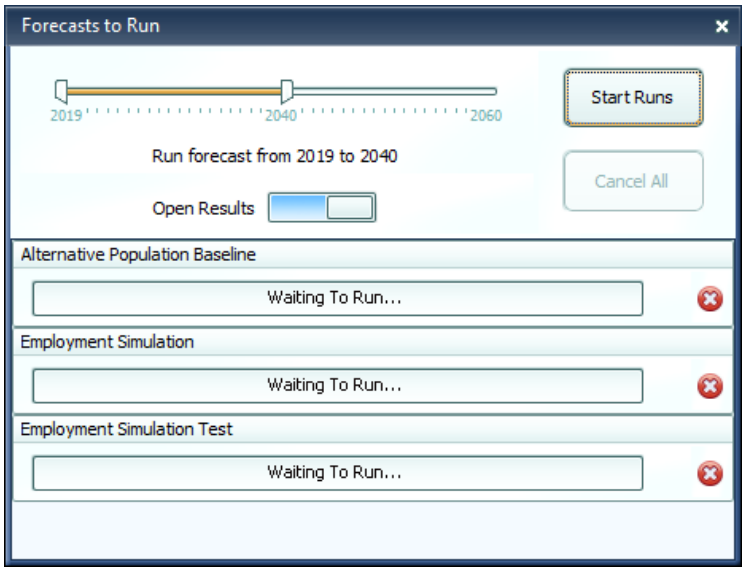


Figure 4: Add to Run Queue

Search Filters

Clicking on the right-hand **Search Filters** panel on the Forecast List pops open a set of useful options for filtering down the list of known forecasts. There are filters for viewing only national or regional forecasts, for hiding all simulations or all controls, for seeing only forecasts modified within a recent time period, for hiding study related forecasts, and lastly, an auto-complete search filter for retrieving forecasts with information matching the search terms.

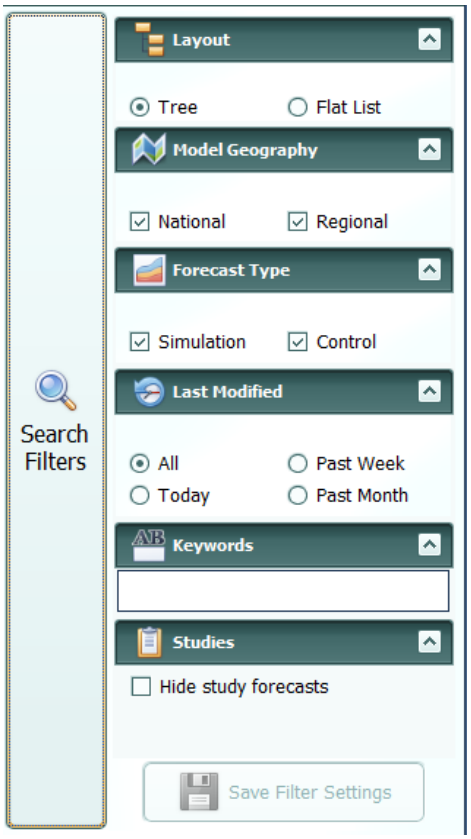
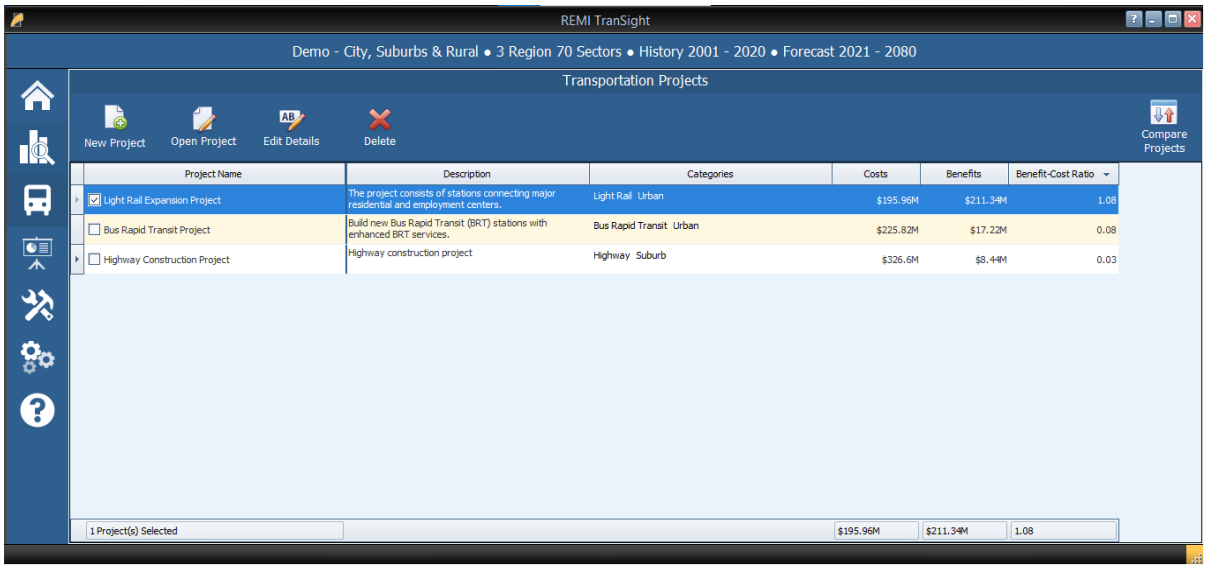


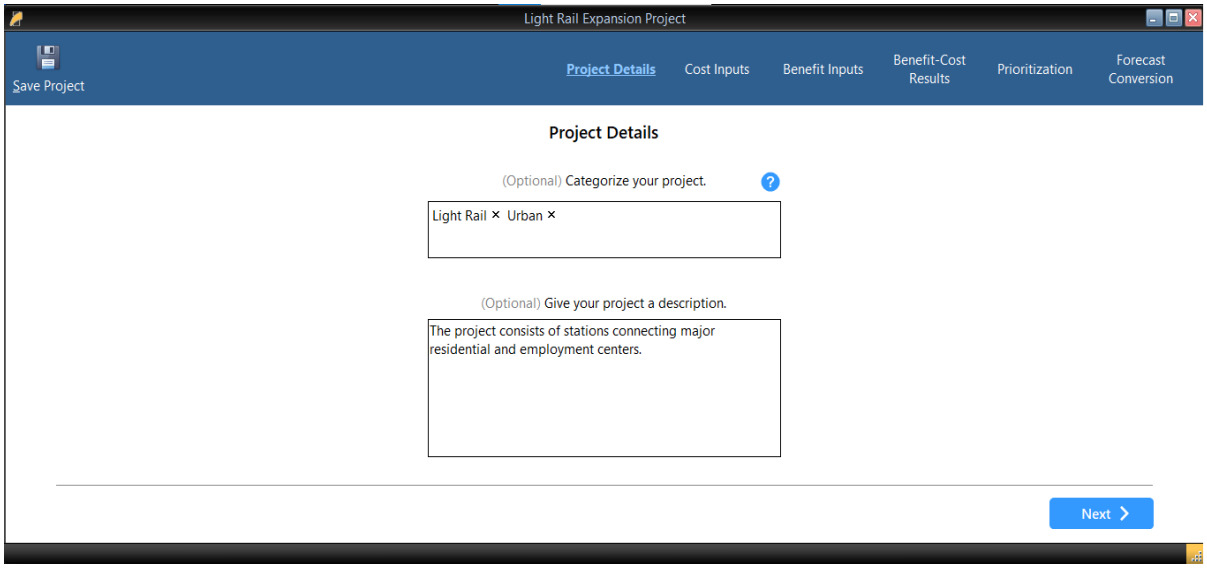
Figure 5: Search Filters

Transportation Projects

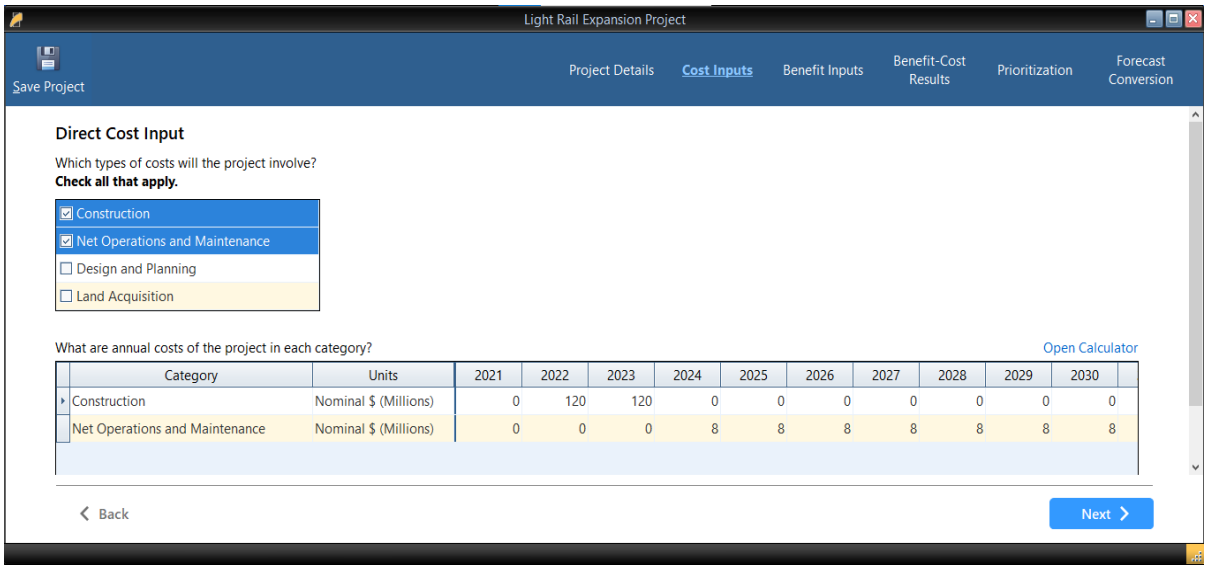
Transportation projects is a system allowing you to name, customize, and add specific construction and cost variables to your project. It also add such features like the Benefit-Cost analysis and gives you the ability to prioritize your projects based on their Benefit-Cost value. It displays your project's costs, benefits, and Benefit-Cost value, in addition to letting you edit them alongside your other projects. Finally, you can add your project as a policy variable input to a forecast and combine it with other variables, creating amalgamations of both transportation projects and specific economic policies. Below is a step-by-step guide to create a new forecast.



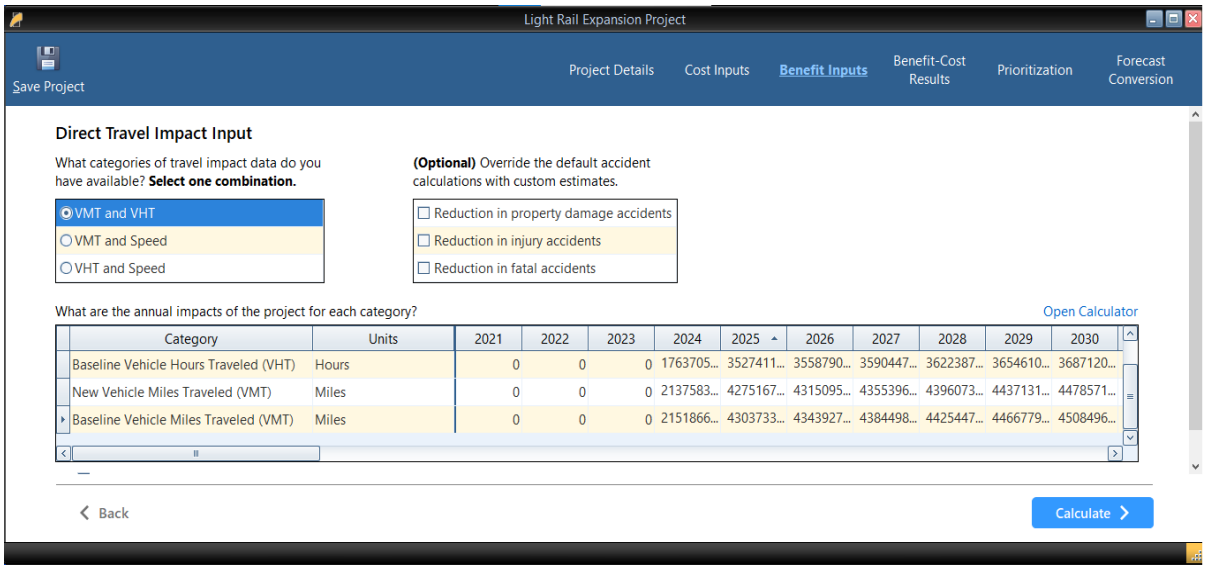
1. **Project Details** – This tab allows you to categorize your project and give it a description, adding custom categories like 'I-95 Extension' to pertain to your current projects.



2. **Cost Inputs** – Here you add your direct costs pertaining to Construction, Net Operations and Maintenance, Design and Planning, and Land Acquisition. Clicking 'Show Descriptions' allows you to specify your various costs.

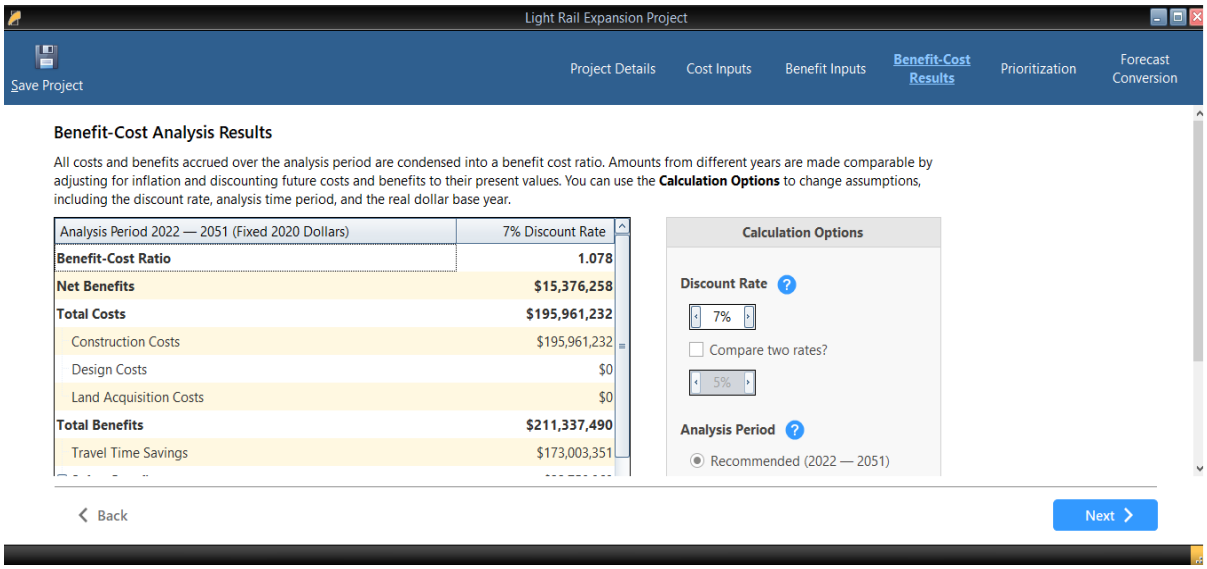


3. **Benefit Inputs** – In this tab, you can add Baseline and New data for your construction project. Baseline data is the state of the world without your new project, while New data is the adjusted world with your project constructed. You can also add in projected decreases in vehicular accidents, with positive numbers indicating a reduction in accidents, while negative numbers indicate an increase in accidents.

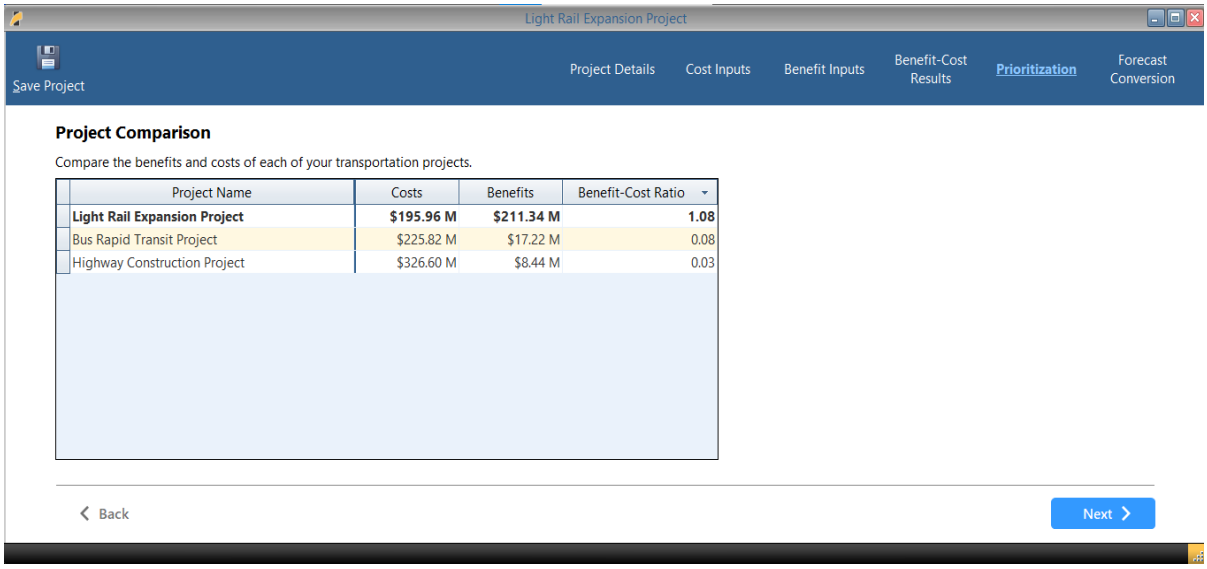


4. **Benefit-Cost Results** – This tab gives you an analysis of your project's Benefit-Cost Ratio, with a positive number indicating a positive return on investment and a negative number indicating the opposite. The total costs of your project are compared to the projected total benefits, with breakdowns in vehicle operating costs, safety benefits from accident reduction, and emissions benefits all included. You can also change the period of your analysis, as well as changing your base real dollar year. Finally, you can change the discount rate for

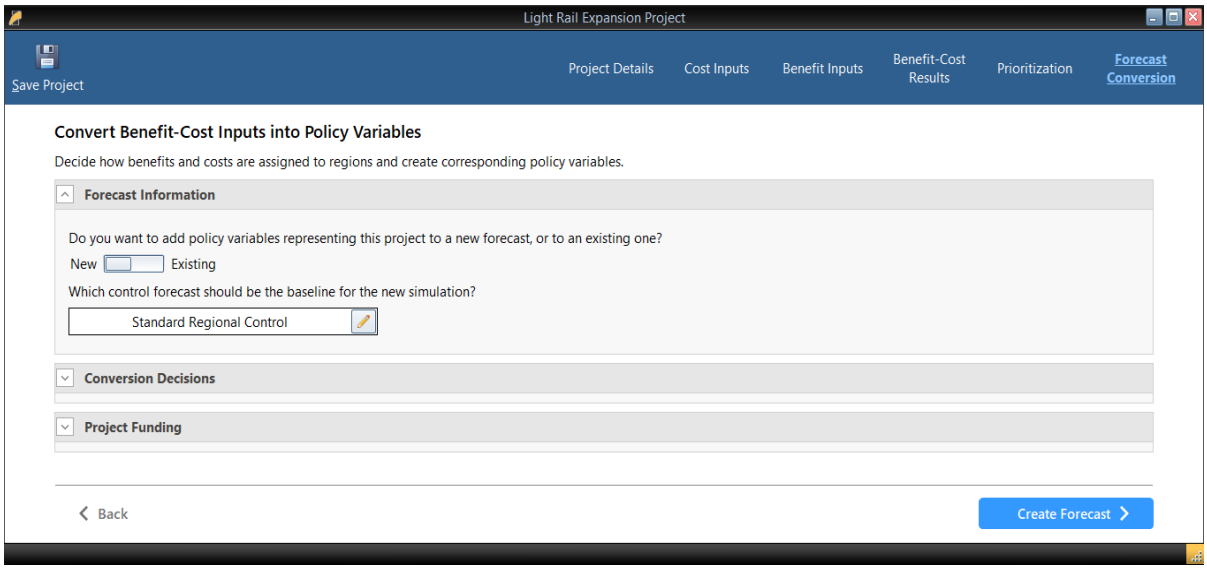
your project, which estimates that the sooner a project's costs and benefits occur, the more valuable that project is.



5. **Prioritization** – Prioritization allows you to compare various projects and determine which is the most cost effective, factoring in the Benefit-Cost Ratio discussed previously.



6. **Forecast Conversion** – Forecast Conversion allows you to convert your transportation project into a REMI policy variable. With your transportation policy variable, you are then given the option to add it to an existing or new forecast, as well as choose the base forecast control you'd like to compare it to. You can also choose the percentage of the total transportation region your project affects. The last tab, Project Funding, determines where your project receives its funding from, and allows you to pick multiple different choices that help fund your project.



7. **Create Forecast** – When you are finished creating your transportation project, you will be given the choice to either save your project and quit or to add it to a forecast as a policy variable.

Studies

Studies are a feature designed to simplify certain projects that involve many forecasts and to provide special multiple-forecast result views. There are several study types (some product-specific), each of which requires different inputs and produces different results. Every type of study has a convenient interface for specifying the relevant inputs that will be used to create each of your forecasts, all in one place. The study editor also has a section for previewing what forecasts would be created based on your current set of inputs and allows for giving names to each not-yet-created forecast in advance. Once satisfied with the study's forecasts, you can run them all automatically, one after the next, and then view the unique results of the study. Every forecast created by a study is still a regular forecast that can be opened as normal to view its individual inputs and results.

Our goals with this feature are to facilitate the quick creation of large numbers of forecasts and to begin offering built-in sets of results that involve comparisons between forecasts. There is great potential for new types of studies with unique results in future versions, so make sure to tell REMI about other types of studies that would help you!

Study List

The study list can be found by clicking the **Studies** tile on the home window. Similar to the forecast list, the study list allows you to create new studies and manage your saved ones. Saved studies display their associated forecasts beneath them and these forecasts can be opened from the study list screen for convenience. Note that if you would like to keep your study-generated fore-

casts separate from your normal forecasts, there is a savable option on the main forecast list to hide all study-generated forecasts from view. The study list is shown below in **Figure 6**.

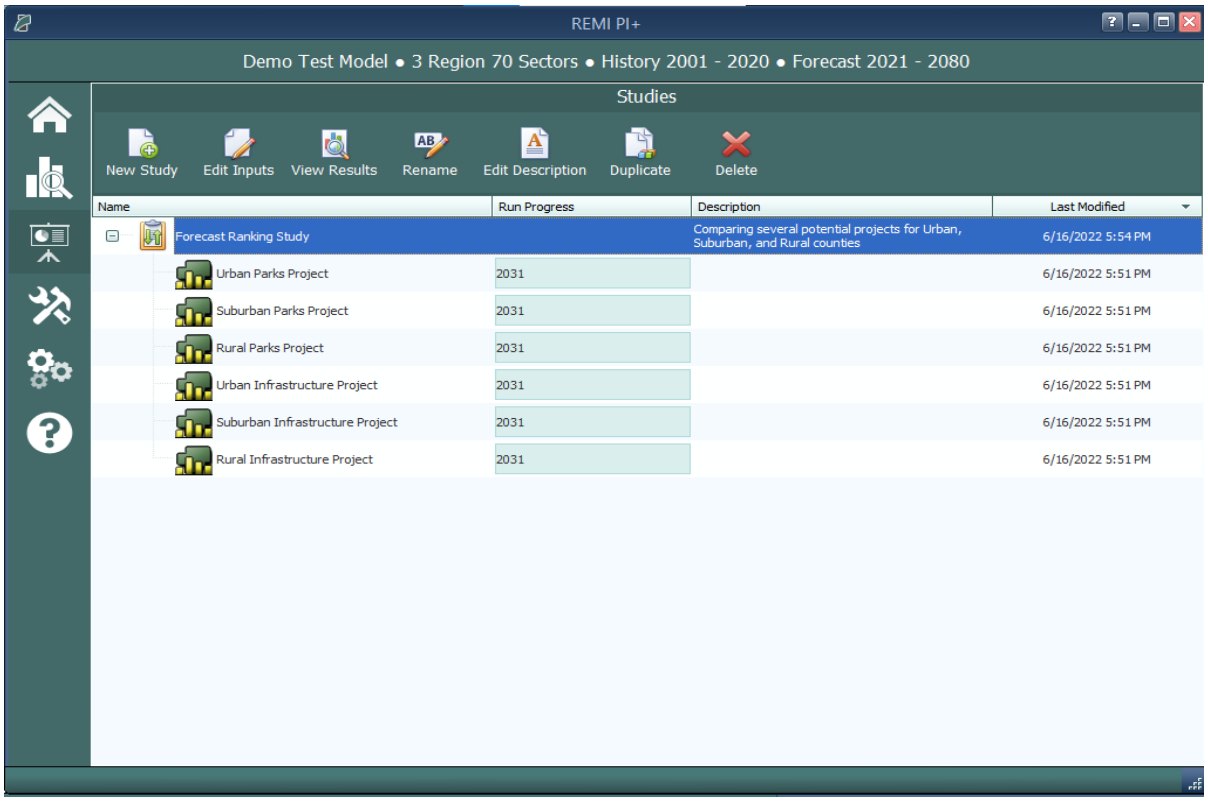


Figure 6: Studies List

Study Editor Window

The window used to create and edit studies is divided into three sections: **Inputs**, **Forecasts**, and **Results**. The inputs and results sections are unique to each type of study, so you will want to see the relevant sections for each type of study further down for more. Unlike the inputs and results sections, the forecasts section shown in **Figure 7** is largely the same for each study type. This tab hosts the study forecast list, which previews the forecasts to be created by the study (or shows created forecasts if the study has already run). The forecasts section also has an editor that is used to select the control forecast that all of the study's forecasts should use as a baseline. This also contains **Run Study** button. Running a study will open a forecast run queue window, shown in **Figure 8**, similar to the one that can be accessed on the main forecast list of the home screen. Each forecast in the study will be run one after the next for the selected range of years. If a study has already been run previously, then attempting to run again will first prompt you to choose whether the previous set of forecasts should be deleted entirely or just disconnected from the study.

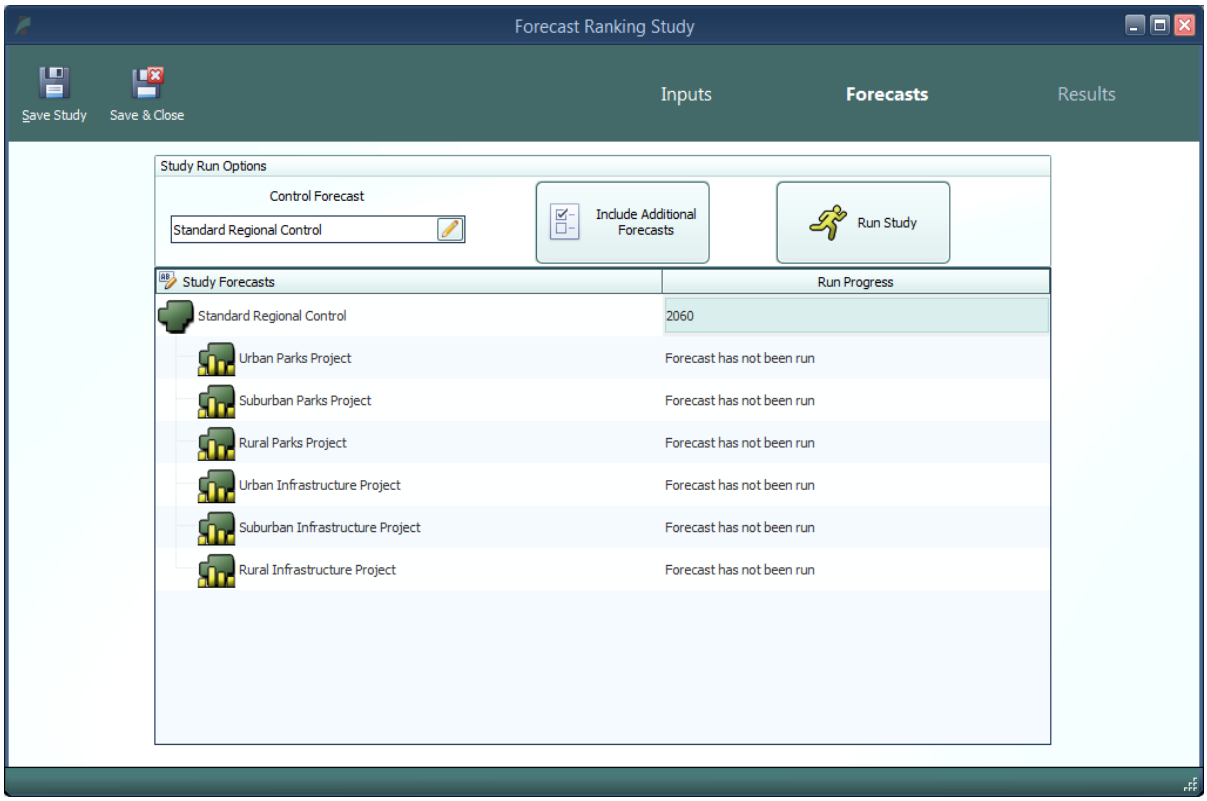


Figure 7: Forecast Ranking Forecasts

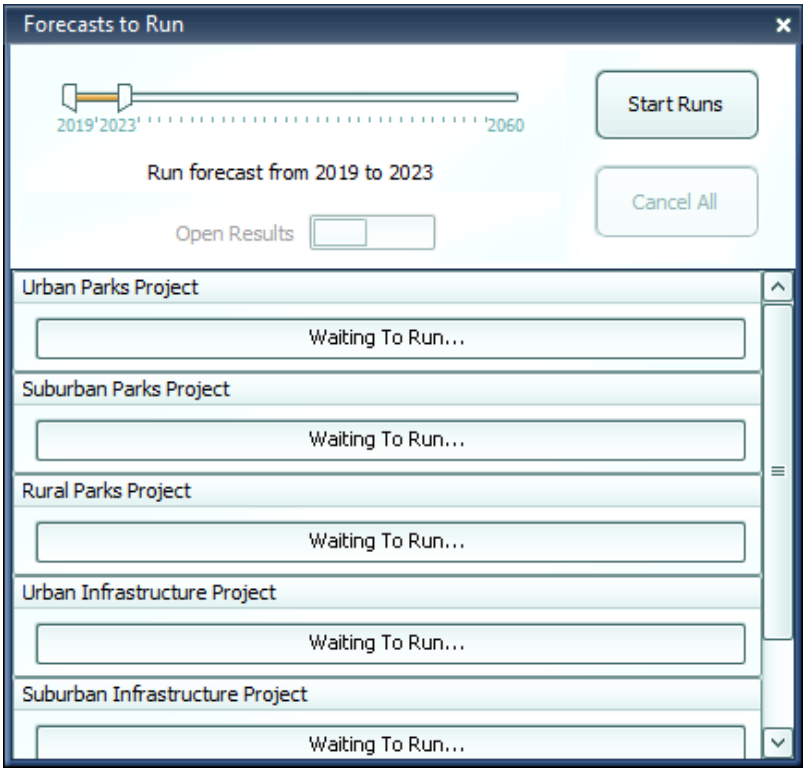


Figure 8: Forecast Queue

Forecast Ranking Study

Forecast ranking studies are the most flexible of our current study types. Their main purpose is to allow for scoring and ranking forecasts in a highly customizable way, based on both their model results and on outside data that you can associate with forecasts. However, this type of study is also the best to use for mass-creation of forecasts and generally comparing results for many forecasts at once.

Inputs

The first section of the forecast ranking study editor is the inputs list, as displayed in **Figure 9**. Policy variable inputs can be selected manually or imported from XML export files using the buttons at the top right. Multiple files can be imported simultaneously by multi-selecting on the file selection window. Each group of policy variables that are selected or imported will be listed as one item in the inputs list, labelled with a default name for the forecast that would be created using those inputs when the study is run. These default names can be edited so that when forecasts actually get created, they will already be named. To view policy variables themselves rather than just future forecast names, double click or use the **View** button on the right with an item selected. Note that, in order to edit any particular group of policy variables, you must first view the group and then click the edit button that appears in the grid. There are several other buttons on the right of the inputs list that perform manipulations of the selected policy variable lists, which might be useful in the process of constructing your inputs. You can select a contiguous range of input lists for manipulation by clicking and dragging and you can select a non-contiguous range by clicking with Ctrl pressed. The **Duplicate** function might be useful if you would like to make second copies of selected would-be forecasts with slightly different input values. The **Merge** function will allow you to combine all of the inputs of many would-be forecasts into a single forecast. Inversely, the **Split** function breaks up the inputs list of each selected would-be forecast into many forecasts, each containing a single policy variable from the original list. By using these tools, it should be easier than ever to rapidly create large numbers of forecasts with your required policy variable inputs.

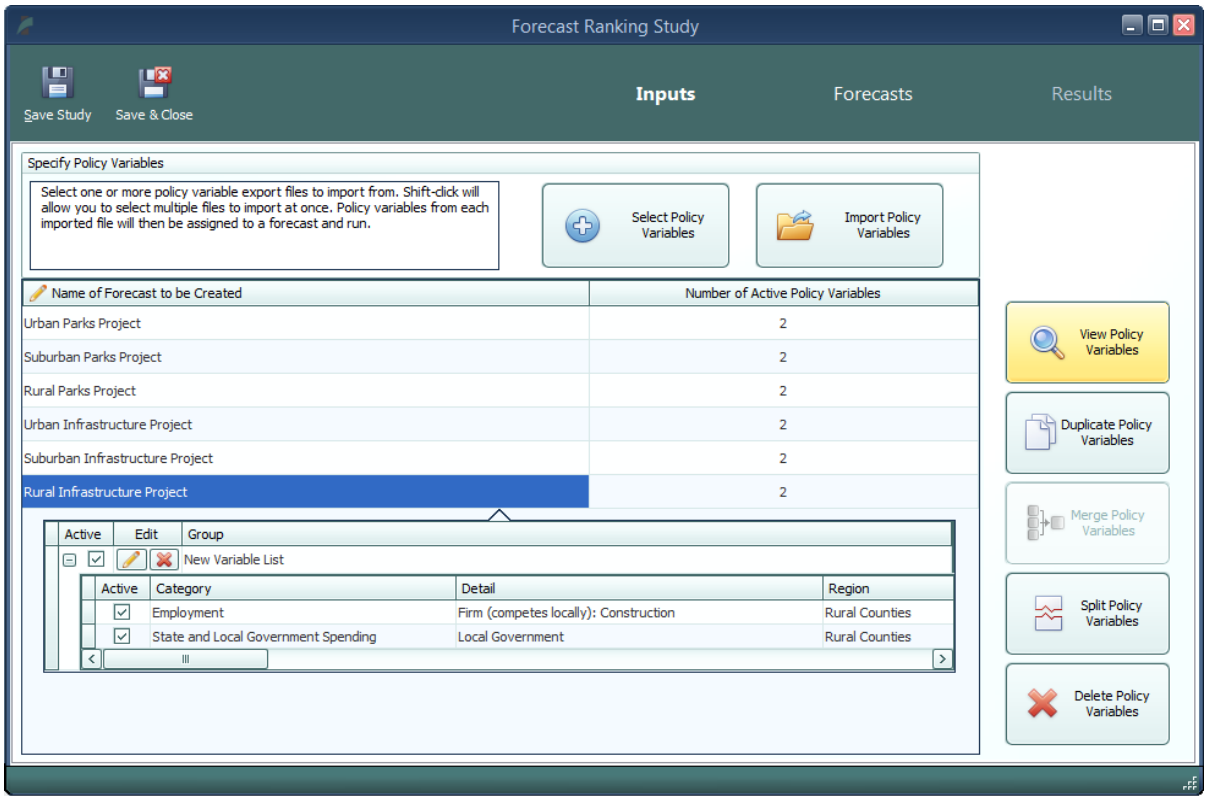


Figure 9: Forecast Ranking - Inputs

Forecasts

As mentioned above, the forecasts section of the study editor is largely the same for each study type. However, because forecast ranking studies have no particular requirements for what inputs belong in their forecasts, there is one special feature accessible only for this study type which allows you to instantly include additional, already-created forecasts in the study's results. Clicking the **Include Additional Forecasts** button will open a list of forecasts that have a matching baseline regional control and are therefore available to include. With this feature, you can view forecast ranking results without specifying any inputs or running the study if you'd prefer to create forecasts individually using the normal forecast window.

Results

Once the forecast ranking study has finished running all of its forecasts, you will be able to access the results section of the editor, as seen in **Figure 10**. The centerpiece of this results interface is the table that displays scores by forecast for each of the currently active economic and attribute scores. The table also contains overall economic scores and overall attribute scores as well as final scores that determine the forecast rankings. On the left of the score table are several sets of controls that determine what is shown on the scoring table. The top group, labelled Forecast Scoring, allows you to create new economic and attribute scores, manage existing scores, and select which scores should be included in the current study's rankings. To learn more about the score editors that handle the creation of new economic and attribute scores, see the appropriate section further

down. The Score Aggregation group determines whether scores are combined together using a simple summation or instead using a weighted average of normalized scores. If you elect to use the weighted averaging method, then weights for each active score will need to be entered using the **Edit Score Weights** button. The last group contains a useful option which switches the score grid to display forecast values rather than forecast scores. To see more information about how a score was calculated, you can hover over its selected cell to see an explanation. If you want to see extra detail about the result values that were used to calculate an economic score, press F1 with a cell selected or right click and choose **View Detailed Result** Values to pop open a results display containing the relevant economic results.

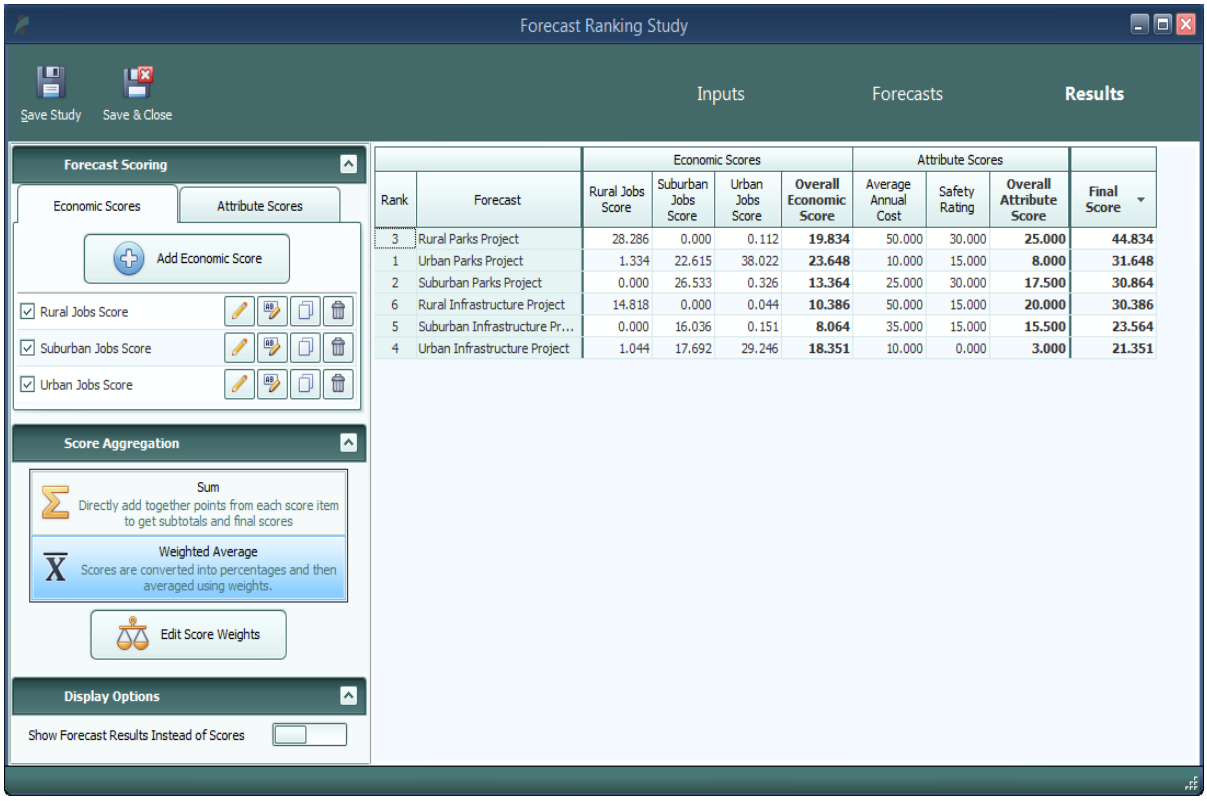


Figure 10: Forecast Ranking - Results

Economic Scores

In a forecast ranking study, economic scores are scores that are based on results from the REMI model. When you create a new economic score, you are able to choose what results the score should be based on and flexibly decide how those results should be translated into a score. The editor for creating an economic score, shown in **Figure 11**, is set up as a step-by-step guide through the process of customizing your score. As you make decisions about how the score should work, further options will be presented until the score is fully specified. Economic scores can be based on individual or aggregated regions and details, they can take into account customizable year ranges, and they can award points to forecasts by ranking, in proportion to result values, or by setting up result value ranges that correspond to scores. Regardless of how you set

up your score, the final step of the guide will display a summary chart illustrating the relationship you have created between result values and awarded points.

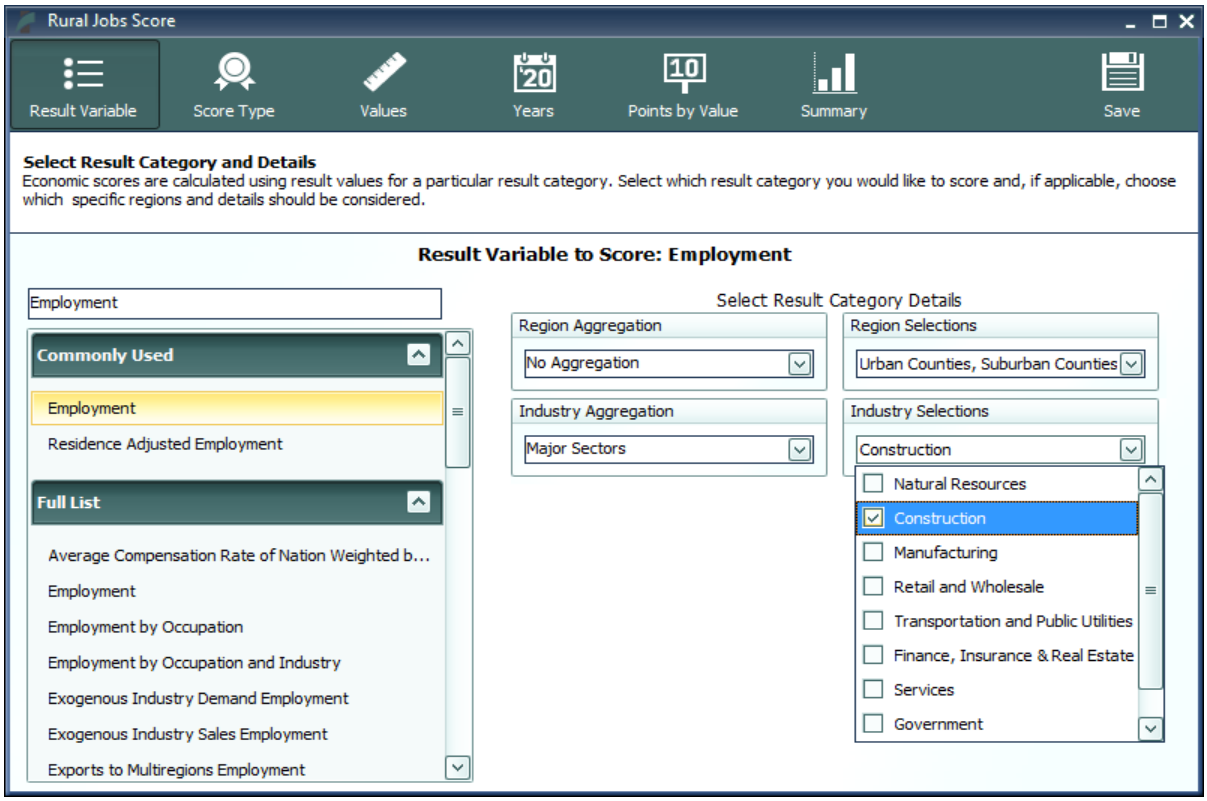


Figure 11: Economic Score

Attribute Scores

Unlike economic scores, attribute scores are not based on model results. Instead, the intention behind attribute scores is to allow you to incorporate extra data into your forecast rankings that is not part of the REMI model. Attribute scores can flexibly score both categorical and numeric data types and they share a similar guided editor to the economic score editor, depicted in **Figure 12**. Categorical data, an example of which might be safety ratings for construction projects, is specified by creating a number of categories that represent all possible values of the attribute and then assigning points to each value. With numerical data, such as a project cost, scores can be determined with the same set of options available to economic scores: by ranking, in proportion to values, or by setting up value ranges that correspond to scores. Numerical scores also allow you to choose from a predefined list of unit labels that may apply to your attribute and also to add a custom unit label. The attribute score editor will show you a summary chart illustrating the relationship between your attribute's possible values and the points that would be awarded to a forecast with that value. Finally, you need to assign values for that attribute to study forecasts, so that the attribute can be incorporated into the forecast ranking study results.

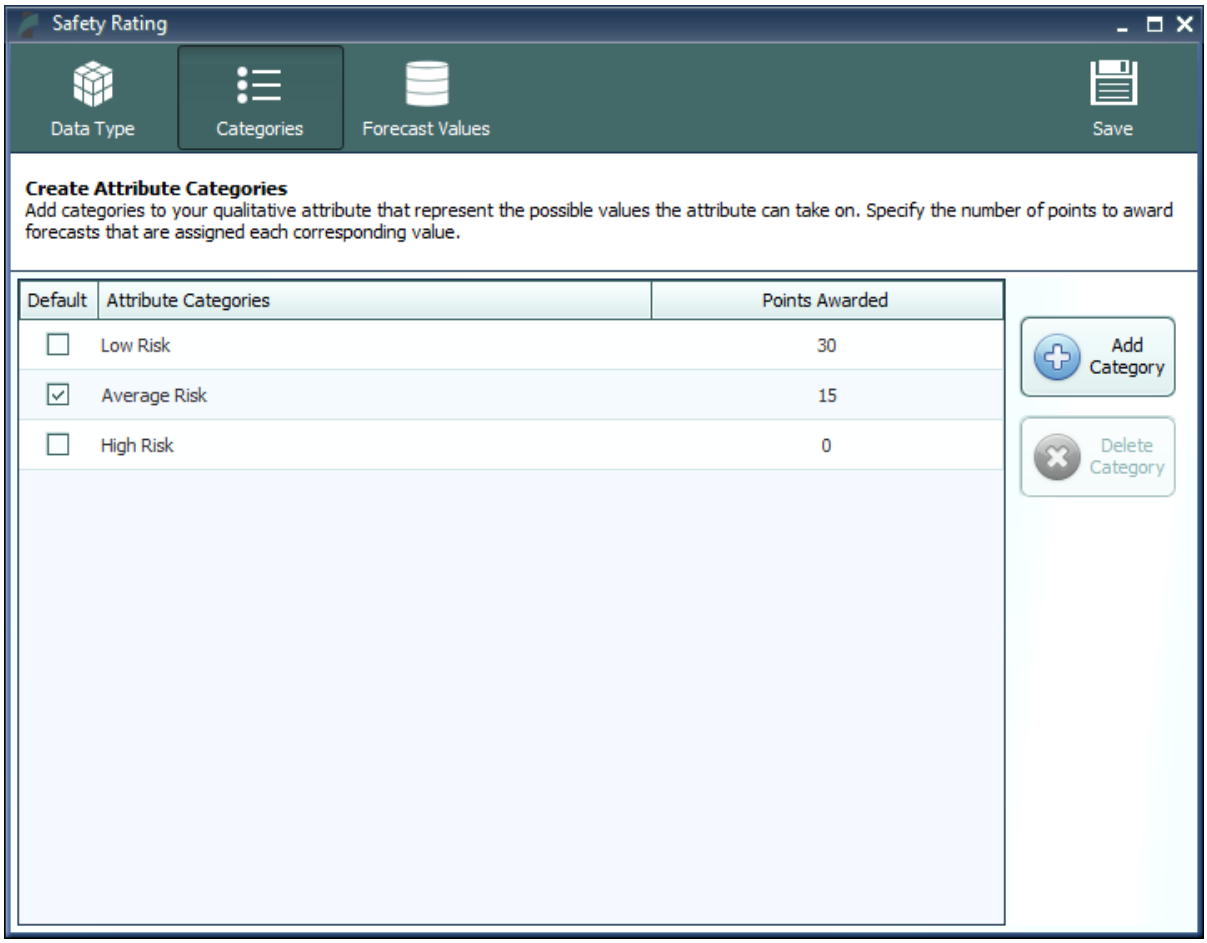
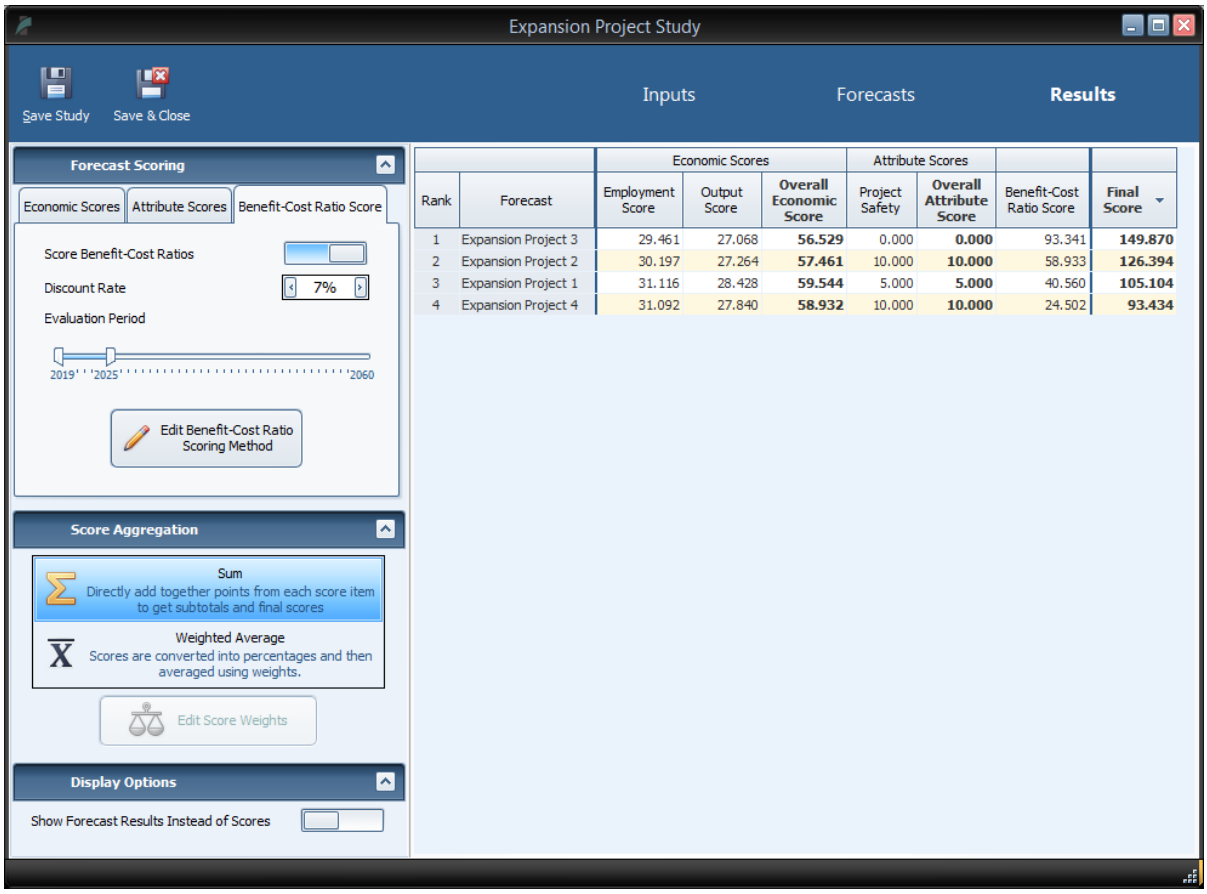


Figure 12: Attribute Score

Benefit-Cost Ratio Scores

There is a third type of forecast score that is exclusive to TranSight, benefit-cost ratio scores. Forecasts to be scored in this way must have travel demand policy variables that produce benefits and costs, otherwise there will not be a valid ratio to score. Since travel demand policy variables are created by the Travel Demand Editor, you will need to create these policy variables through a regular forecast and then either export and import them into your study or include the forecasts in the study directly. Using the controls on the Benefit-Cost Ratio Score tab of the Forecast Scoring group, shown in the upper left of **Figure 13**, you can change the discount rate and evaluation period parameters that go into benefit-cost calculations. Unlike the other types of scores, there can currently only be one benefit-cost ratio score per study. To change how benefit-cost ratios are scored, click the **Edit Benefit-Cost Ratio Score** button to open the score editor. This editor, shown in **Figure 14**, has the same options as the other score editors for scoring by rank, by proportional value, and by value ranges.



		Economic Scores			Attribute Scores			
Rank	Forecast	Employment Score	Output Score	**Overall Economic Score**	Project Safety	**Overall Attribute Score**	Benefit-Cost Ratio Score	**Final Score**
1	Expansion Project 3	29.461	27.068	**56.529**	0.000	**0.000**	93.341	**149.870**
2	Expansion Project 2	30.197	27.264	**57.461**	10.000	**10.000**	58.933	**126.394**
3	Expansion Project 1	31.116	28.428	**59.544**	5.000	**5.000**	40.560	**105.104**
4	Expansion Project 4	31.092	27.840	**58.932**	10.000	**10.000**	24.502	**93.434**

Figure 13: Forecast Ranking Results

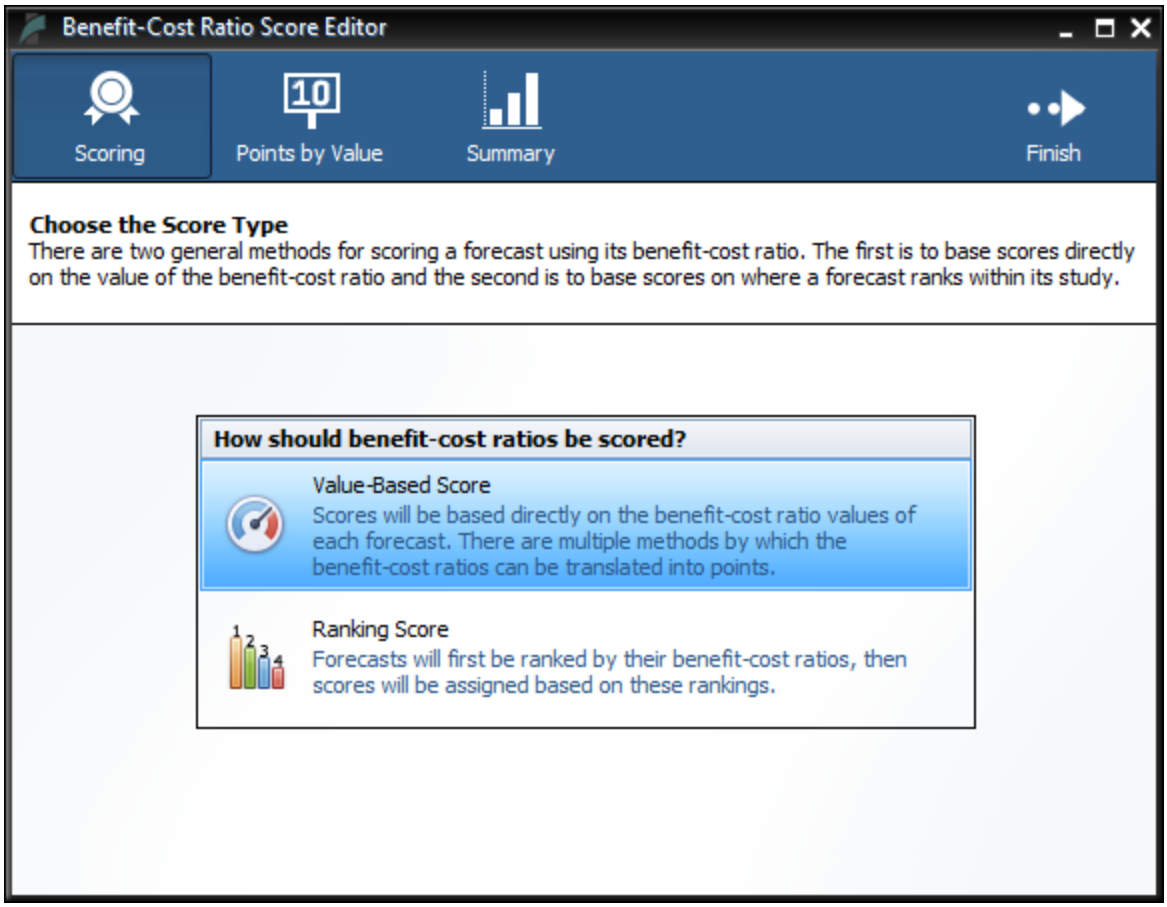


Figure 14: Benefit Cost Ratio Score Editor

Tools & Settings

The Tools & Settings section of the main window contains, as the name suggests, several tools and settings that will be useful for customizing TranSight and performing advanced tasks.

Figure 15: Tools & Settings

Exporting and Importing Forecasts

Perhaps most important among the various tools and settings available on the Tools & Settings screen are the forecast export and import features. Due to our new system of automatically managing forecast files, it is no longer possible to simply pass along a ".RWB" workbook file to other users or to REMI for support because a given installation of TranSight will not know about forecasts in files that it did not create itself. The solution to this is our new export and import features. The corresponding tiles are located under the **Tools** heading. The export feature will allow you to select any forecasts you want to share and package them up in a single file that can be imported by another user with the same TranSight model. Exported forecasts will be in either ".FEX" or ".FEXML" file format. The former format will export the entire workbook, and the latter one will export the inputs. These inputs can be rerun when imported, resulting in a much smaller and more readable file. When selecting forecasts for export, be aware that any parent control forecasts are required to be exported as well and will be automatically checked off.

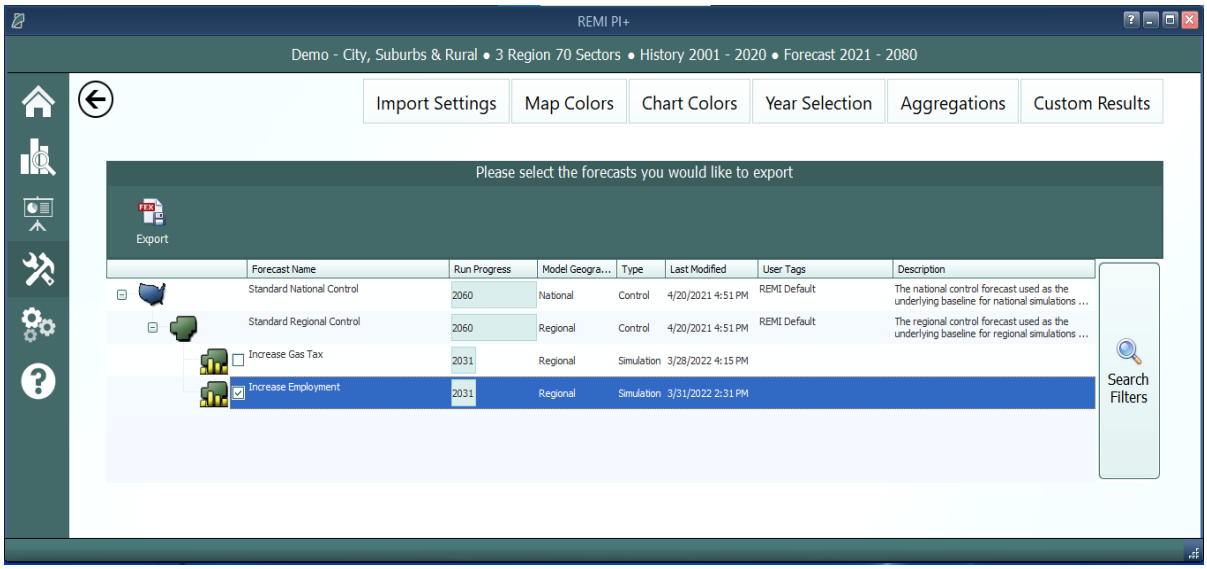


Figure 16: Forecast Export

File Cleanup

Another file management feature is the forecast backup file. Each time a forecast is saved, a backup file is created as well so that there is something to fall back on in case the file is corrupted or lost when it is next used. If you end up with too many backup files in the Workbooks sub-directory of your model folder or if you find that you would like to attempt to access a backup, you can use the File Cleanup feature. The File Cleanup dialog will determine how many forecast files exist that are unknown to TranSight as either backups, exports that have yet to be imported, or any other forecast files and allow you to deal with them by either deleting or importing them.

Options

The options menu consists of several minor settings. You can change the TranSight color scheme, select an alternative tile navigation design, decide whether exported files should automatically open, allow for TranSight to use the Internet to retrieve **OpenStreetMaps** data, supply a sound file for use as an indicator alert that TranSight has finished running a forecast, and select from several alternative industry labelling forms that include NAICS codes.

Map Colors

The map colors interface allows for selecting what colors the map should use when it displays results. To select your preferred color option, choose it from the gallery and click the **Save as Default** button. Custom colors ranges can be created by using the **Add New** button. Three-color ranges are offered for ease of viewing both positive and negative results on the same map while two-color ranges work better for black-and-white printing.

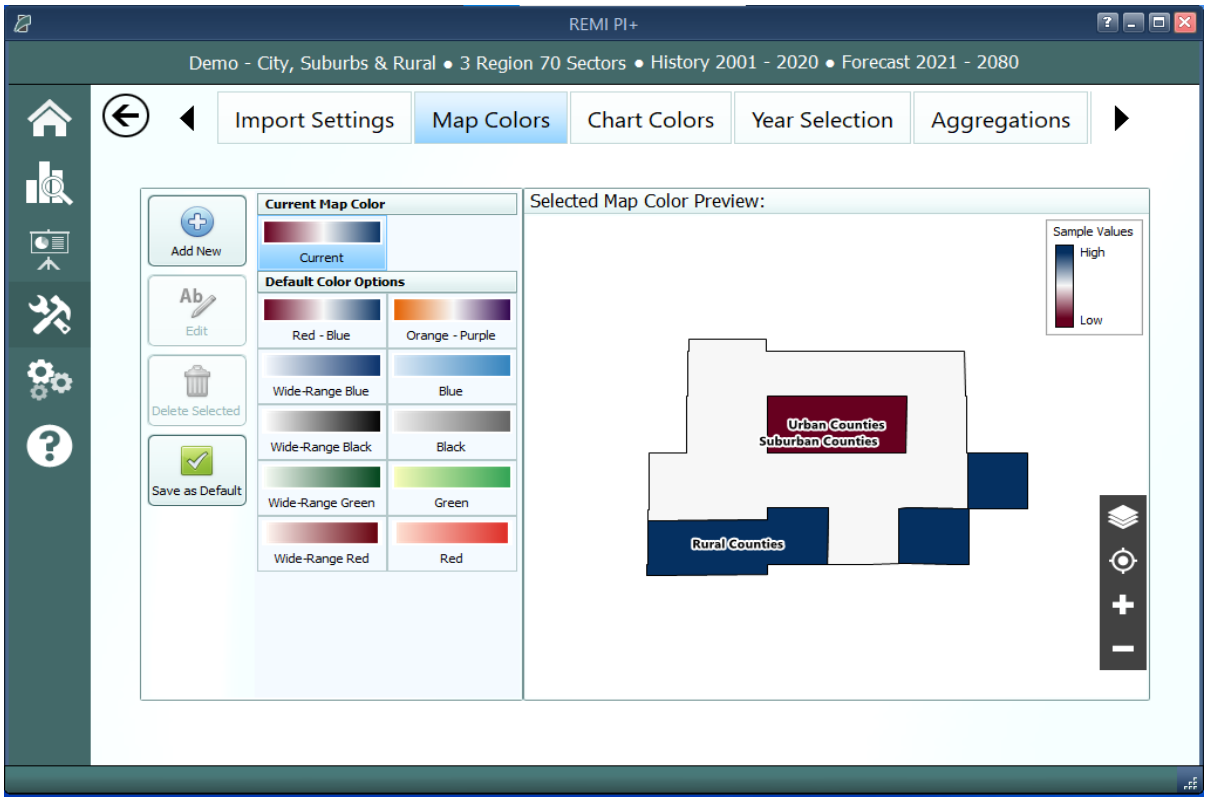


Figure 17: Map Colors

Chart Colors

Similar to map colors, the Chart Colors Selection screen allows for selecting the default palette to be used by the charts on the results. It also includes a tool for creating custom color palettes. Colors can be selected to add to a palette using a color selector tool or by entering RGB or HEX codes.

Year Selection

The Year Selection screen is used to build lists of years for use on the results. Saved year lists that you create can later be applied to result visualizations such that only the years included in the list are shown. This feature is useful if you are only interested in viewing certain years of results and would prefer to have a saved list rather than filtering the years shown by visualizations manually.

Import Manager

Use the Import Manager to import settings and preferences from other REMI models installed on your computer. On Tab 1, choose a source for importing settings. Select from a list of installed models or import from a **REMI Settings File**(.rsf). If you choose to import from a REMI Settings File you will need to then click the **Select File to Import** button and choose the .rsf file to import. Once a source has been selected, Tab 2 will display the available setting that can be imported

from that source. Clicking a tile will take you to Tab 3 where you can choose which settings items to import.

Certain settings may require additional settings to be imported to work properly, such as importing a favorite result table with custom result variables. The favorite result will not display the custom result if it is not also imported.

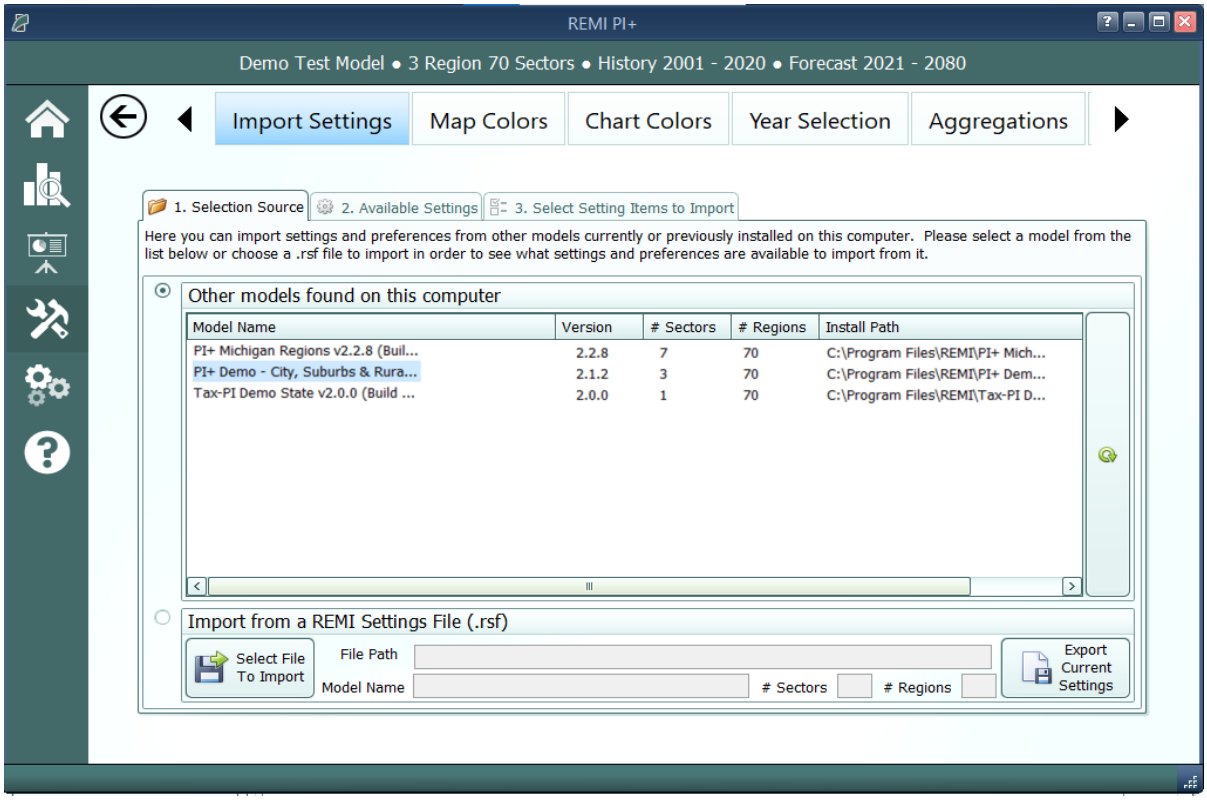


Figure 18: Import Manager

To export the current model settings click the **Export Current Settings** button under the **Import from a REMI Settings File (.rsf)**. This file can then be shared with other users and assistants or be used transfer settings between computers.

Aggregation Manager

Aggregations are groupings of details including regions, industries, commodities, occupations, and ages. They have been thoroughly integrated into the model with respect to both policy variable creation and the results. Aggregations save time when you are interested in only certain details or when you would like to define your own customized structuring of all the details. The **Aggregation Manager** allows you to create aggregations for each of the five supported detail types. Aggregations that you import from other models using the **Import Manager** appear here.

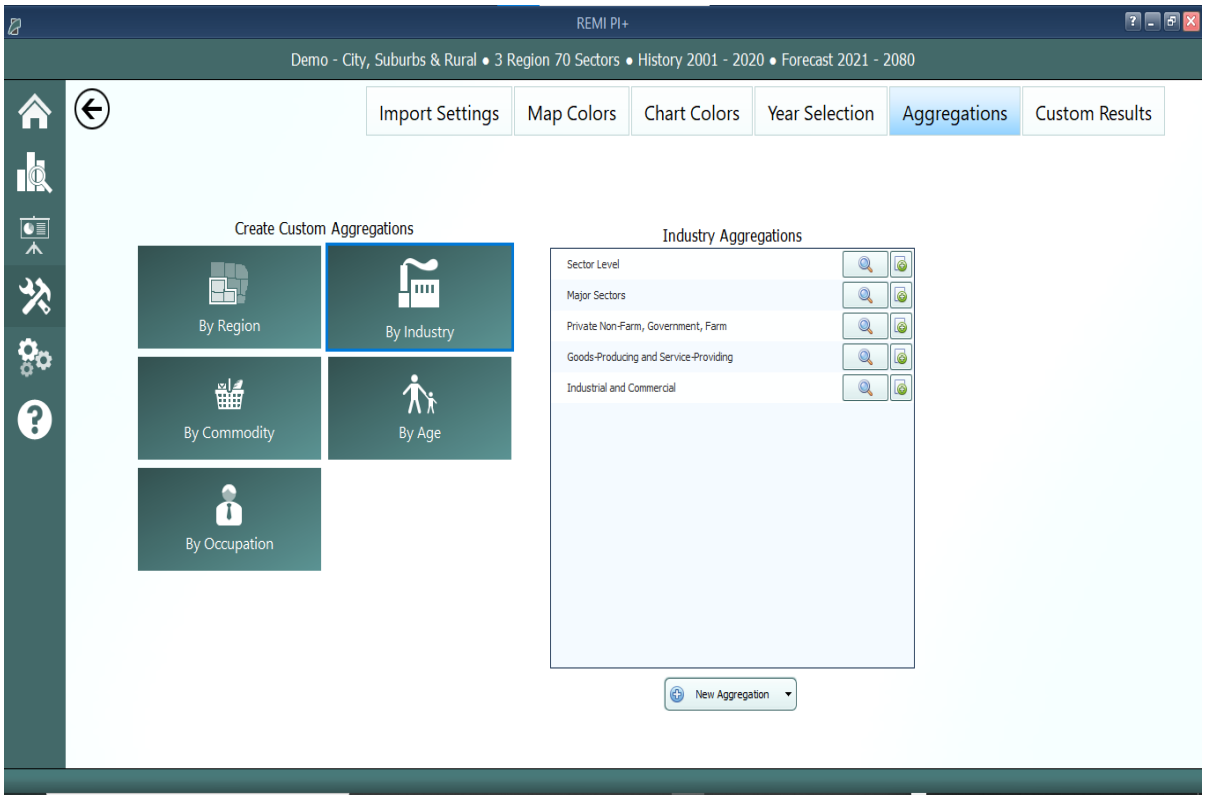


Figure 19: Industry Aggregation Manager

For most of the detail types, you will find some default aggregations built by REMI. You can view these default aggregations to see how they categorize details and also duplicate them if you would like to make a small change. For making a completely new aggregation, click the **New Aggregation** button at the bottom of the aggregation list. Depending on your model and the detail type, you may be prompted to choose what level of detail you would like to use in building the aggregation. For example, a 70-sector model would be able to create industry aggregations using the default 70 sectors or, optionally, using 23 sectors instead.

Creating a custom aggregation will open the Aggregation Editor. The first decision you need to make is whether to make a **Strict** or **Flexible** aggregation. The difference between each option is detailed within the selection gallery. It is also possible to change this later, although when switching from **Flexible** to **Strict** some changes will be made to your aggregation groups to make them valid for a Strict aggregation.

To build an aggregation using the Aggregation Editor, simply create some groups using the **Add Group** button, give them meaningful names, and then drag details from the left-hand list box onto the groups. In long lists of details, it may be useful to use the search box to filter the list. Groups and details can be deleted by selecting them and clicking the **Delete Selection** button, and details can be moved between groups or back to the left-hand list box by dragging. There are additional detail-moving features located in the right-click menu. Using the Aggregation Editor to create a region aggregation includes a map as an additional tool. Regions listed in either list box can be

selected using the map (hold shift while dragging to multi-select on the map) and the map also serves to visually indicate how your regions are being aggregated.

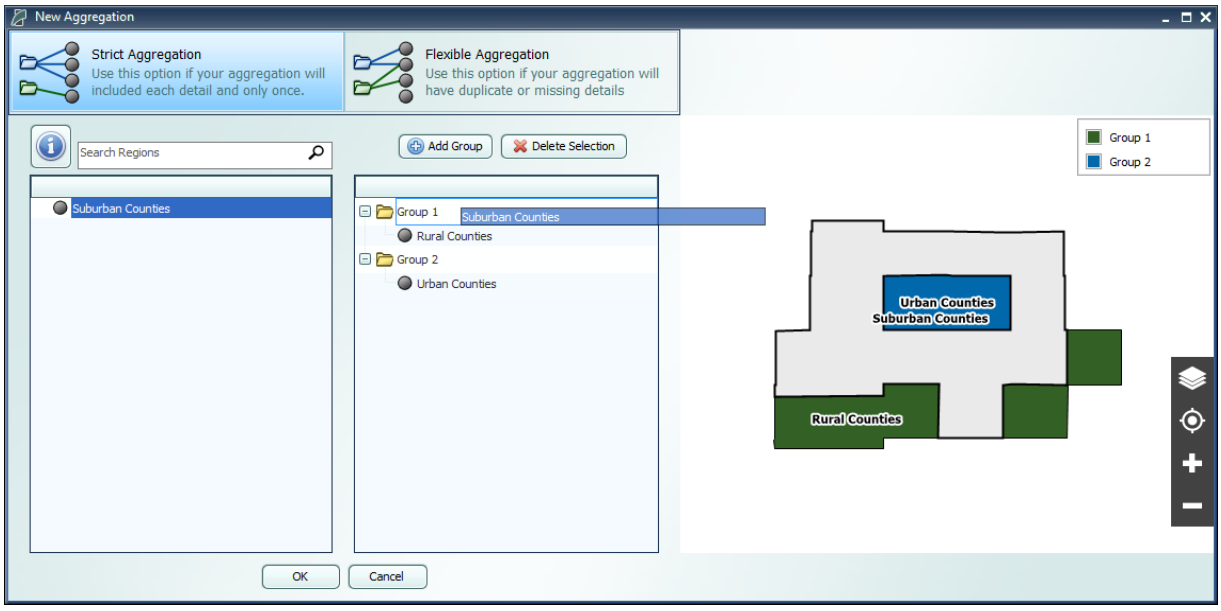


Figure 20: Region Aggregation Editor

Once finished, the aggregation will appear on the Aggregation Manager's list and can be given a name. This saved aggregation will now be available when creating policy variables with the same detail type. Instead of selecting from the regular detail list, you will be able to select from groups you created when building the aggregation. In some cases, where policy variables only allow a subset of the full detail list (such as industry policy variables that exclude farm and government industries), your aggregation will be automatically filtered to remove excluded details and groups containing only excluded details. Similarly, results can also be displayed at the level of your aggregation groups rather than the regular detail list.

Custom Results

Custom results allow users to create new result variables by performing operations on the default results or other custom results. There are three methods to create custom results: Adjust by Constant Factors, Define Equation, and Weighted Spreading. All three types of custom results can be created through the Custom Results Manager shown in **Figure 21**. When you select a method under "Create Custom Result," a Custom Result Builder window appears where you can specify how your result is calculated.

The Custom Results Manager lists your custom results along with their method type, the original result that was adjusted (called the "base variable") and which types of forecasts can display the variable. The manager also has several right-click options, including one to change the name and description of a custom result. The rightmost column of the manager contains buttons to edit and delete custom results.

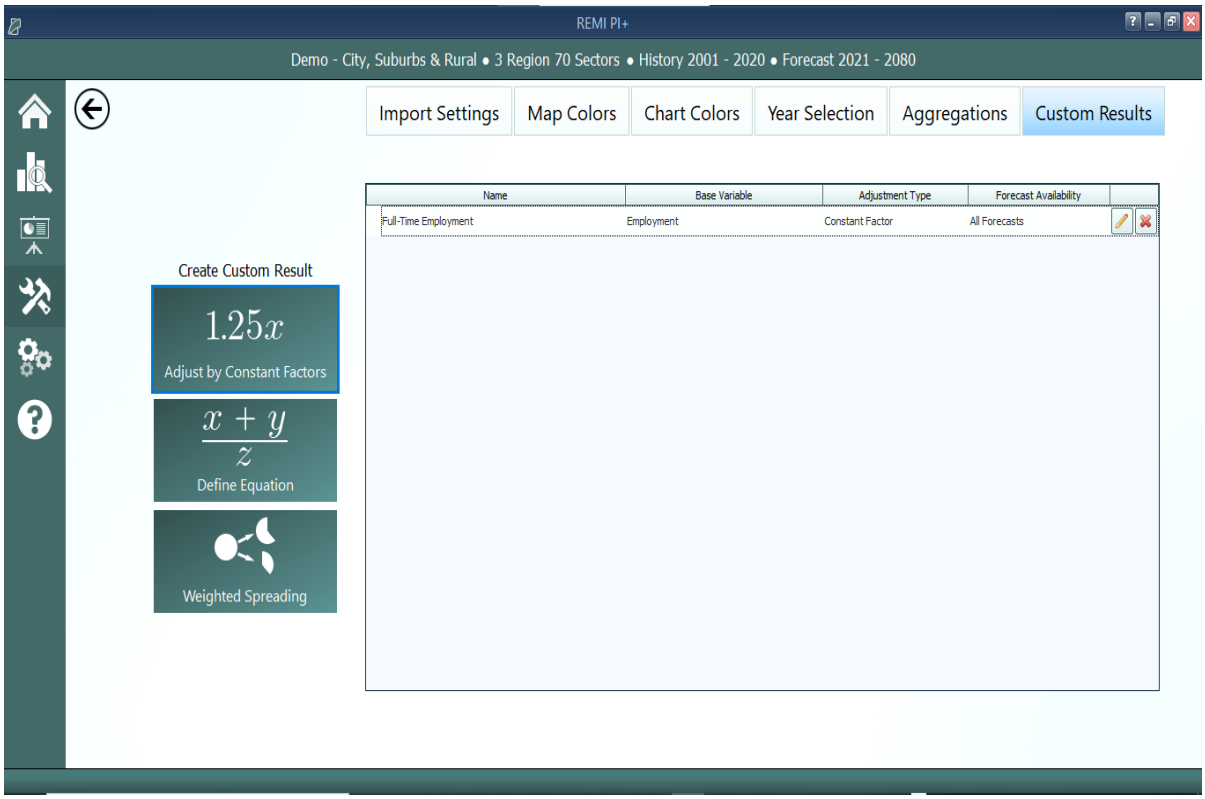


Figure 21: Custom Results Manager

Adjust by Constant Factors

Use this option to create custom results by making an additive or multiplicative adjustment to a result, as shown in the Custom Result Builder in **Figure 22**. Specify the base variable by searching for the result in the Base Variable text box or by selecting from the list, where other custom results that are compatible with this option are listed first. After selecting a base variable, a list of detail dimension will appear. Toggling on/off the individual detail dimensions will modify the shape of the grid for entering constant factor values. Select an adjustment factor to specify if the adjustment will be additive or multiplicative. Optionally, you can specify units for your custom result, otherwise the new custom result will display the same units as their base variable. Important information on custom result units can be found in the **Custom Result Units in Forecasts** section.

In forecast results, constant factors will act on the base variable after the base has been converted to the units specified in the forecast. For additive factors, this means that if a GDP-based custom result of 1 billion dollars has an additive constant factor of 2, the custom result will be displayed as 3 billion if the results are displayed in billions of dollars, and as 1,002 million if the results are displayed in millions of dollars.

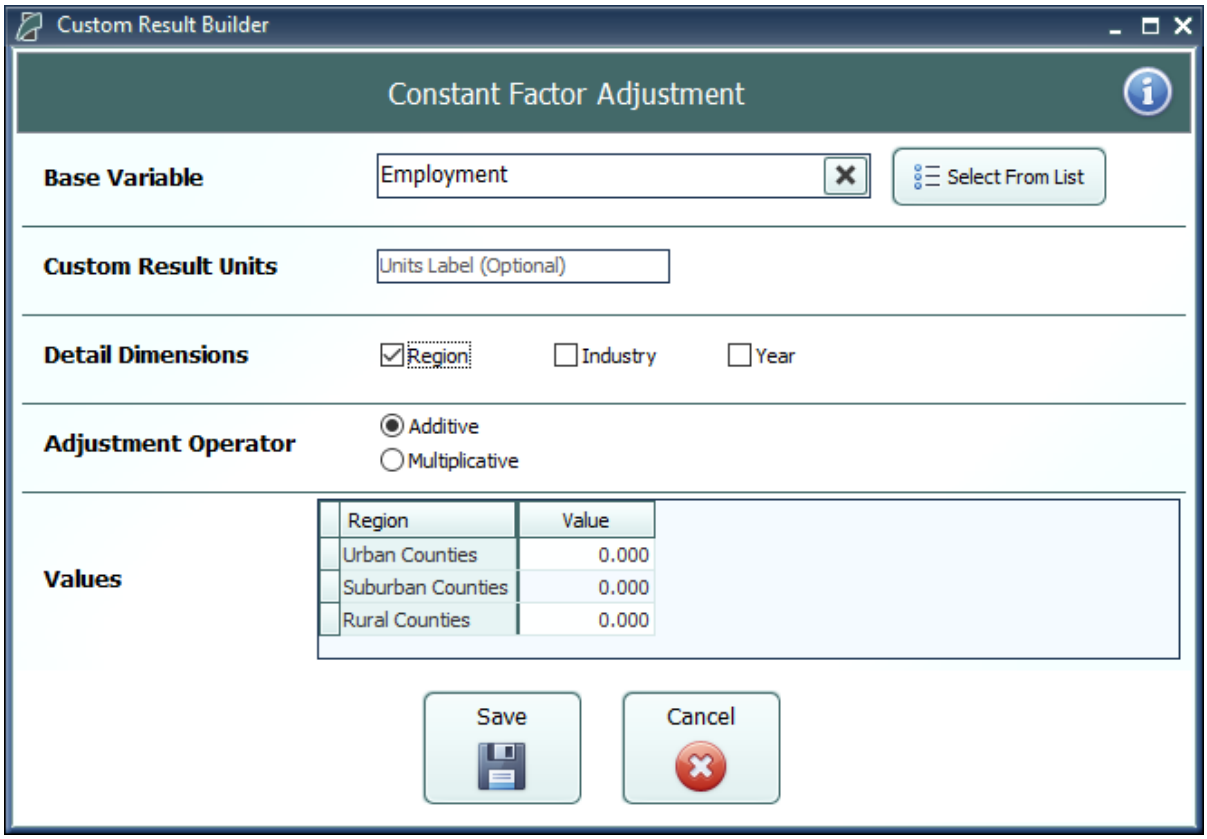


Figure 22: Creating a Constant Factor Custom Result

You can add your custom result to your model by clicking **Save**, at which point the Custom Result Builder will suggest a name and description for your custom result that you can edit as shown in **Figure 23**.

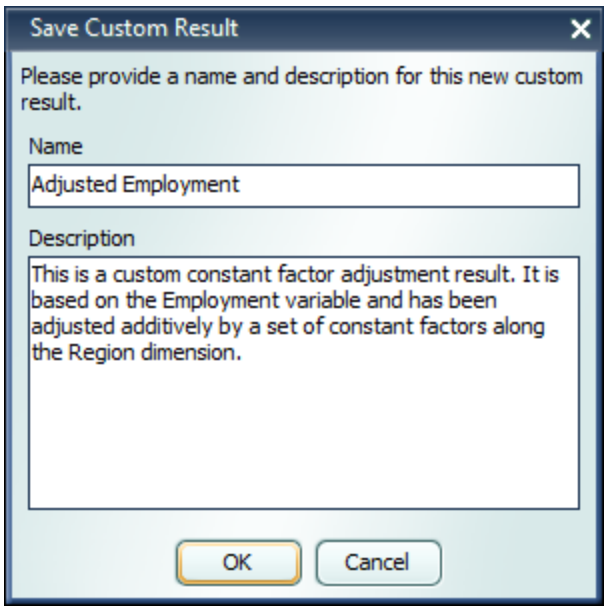


Figure 23: Naming and Describing a Custom Result

Define Equation

Use this option to define custom results by an equation where a base variable acts on another variable, which is called the "interacting variable." In simple cases, you can combine two result variables using a mathematical operator. To produce more complex results, you can create custom results that reference other custom results by selecting them as base and/or interacting variables. An example of this is given in the **Example Custom Results** document.

As shown in **Figure 24**, first select a base variable that will be the first term in the equation by searching for the result in the Base Variable text box or by selecting from the list, where other custom results that are compatible with this option will be listed first. You can then select an interacting variable that is compatible with the base. The units of the interacting variable are automatically selected based on those of the base variable, and can also be changed in some cases.

Depending on the base and interacting variables you chose, you might be able to select from addition, subtraction, multiplication, or division operators. The equation previewer will display the equation that defines the new custom result. Based on the variables and type of interaction, a unit for the new custom result will be suggested that you can edit.

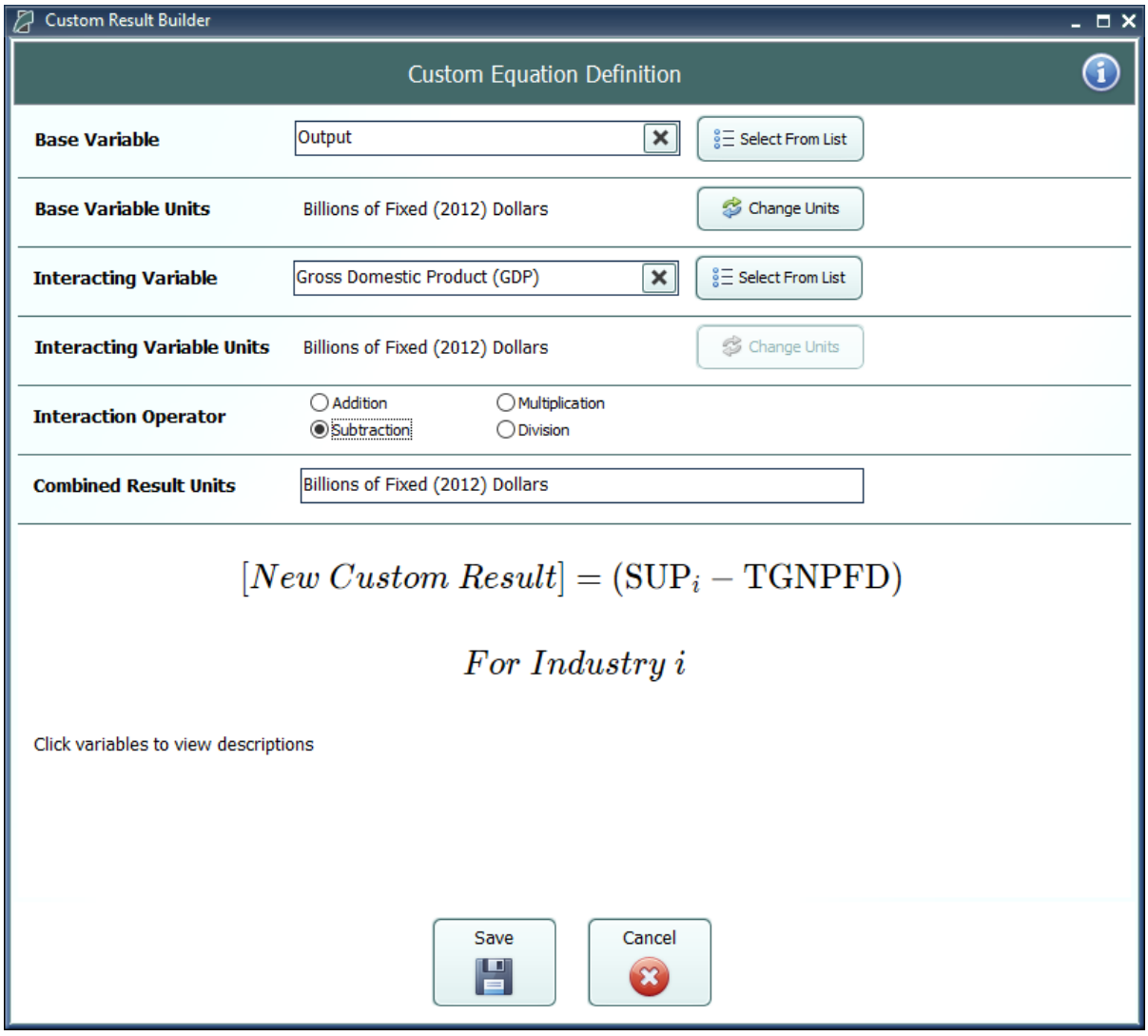


Figure 24: Creating a Custom Equation Result

Similar to constant factor custom results, you can click the **Save** button to save, name, and write a description for this custom result.

Weighted Spreading

Use this option to create custom results where you divide a base variable into subcategories with specific weights. As shown in **Figure 25**, specify the base variable by searching for the result in the Base Variable text box or by selecting from the list, where other custom results that are compatible with this option will be listed first. Select a detail dimension to spread and check the **Year** box if you want to enter different spreading weights for each year. You can choose whether to create the same subcategories under detail by toggling **Synchronize Subcategories** on or off. Click on subcategory names to edit them. You can specify your spreading values as a percentage in the bottom chart of the Custom Result Builder, or as a proportion in the grid of user-created subcategories that will appear when you click **Open In Grid**, as shown in **Figure 26**. In the grid, you

can also paste values and use the calculator feature. If you are using synchronized subcategories, you can specify a Dimension Label for your subcategories that will appear as a header in forecast tables.

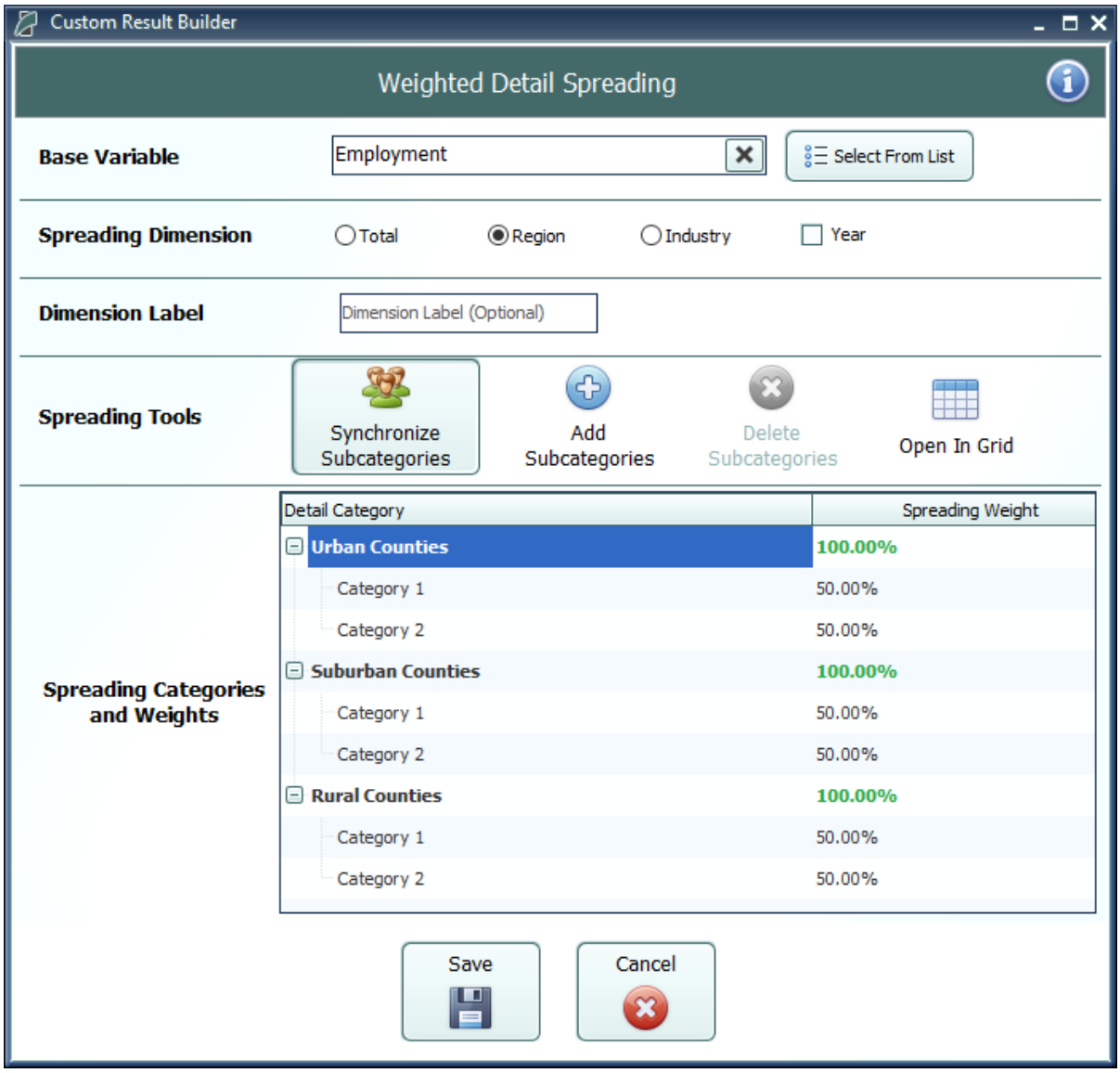


Figure 25: Creating a Weighted Spreading Custom Result

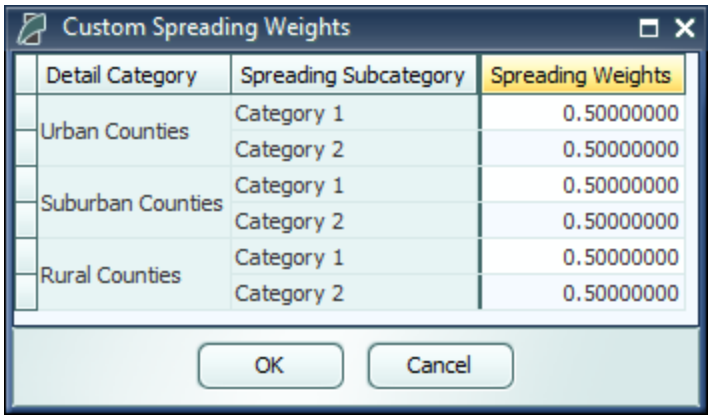


Figure 26: Input Grid

The total spreading weights for each set of subcategories is displayed in a heading. You can, if desired, instantly change a subcategory value so that the total adds up to 100% by right clicking on that value and selecting **Balance Total**.

Similar to constant factor custom results, you can click the **Save** button to save, name, and write a description for this custom result.

Viewing Custom Results in Forecasts

You can view custom results in a compatible forecast by adding them to a Favorite. When selecting results to be shown in a Favorite, click on the **Custom Results** category to see the custom results available as shown in **Figure 27**.

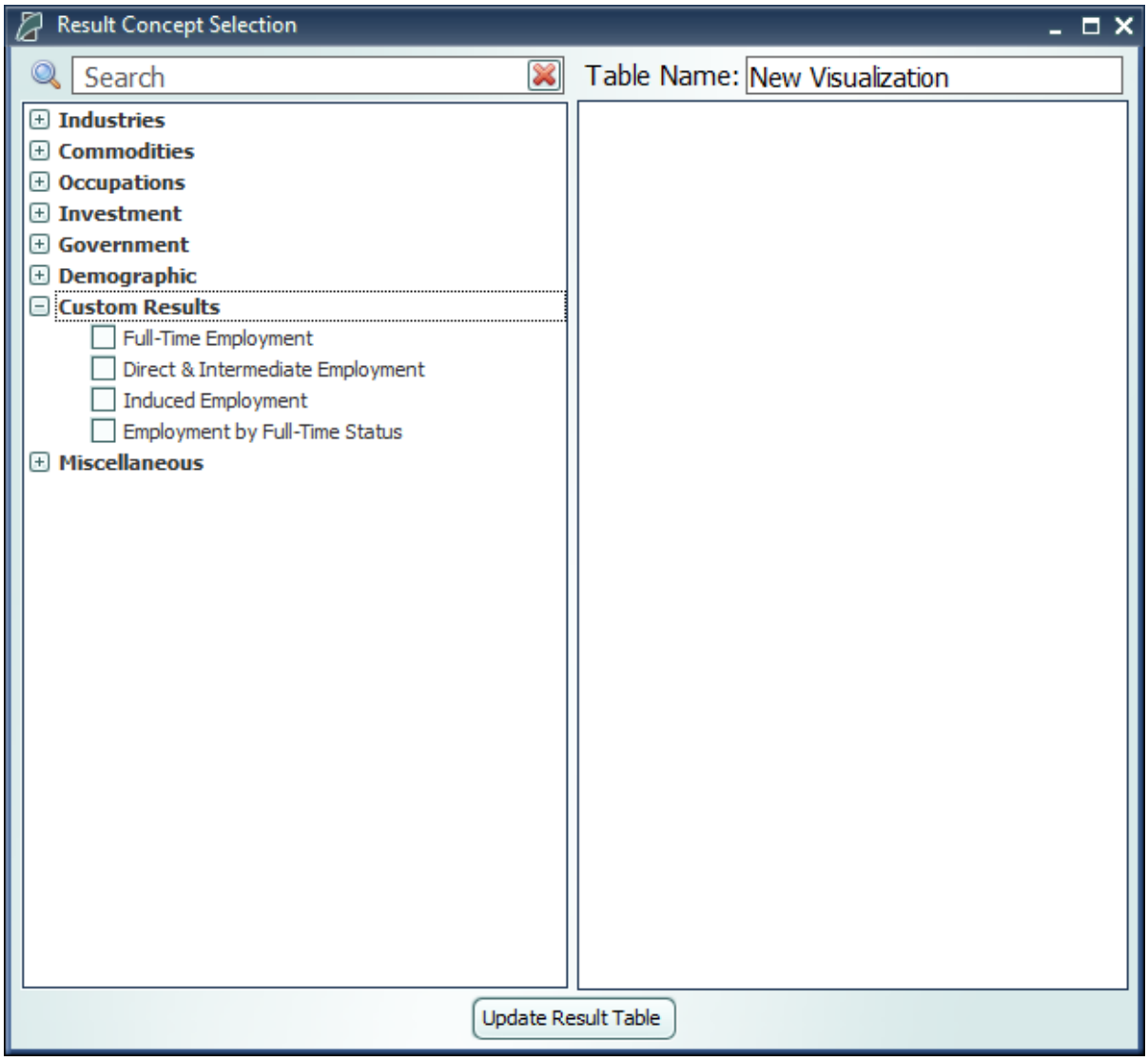


Figure 27: Adding Custom Results to a Favorite

While you can display both constant factor and custom equation results with other results, you can only display weighted spreading results in a visualization alone.

Custom Result Units in Forecasts

Numbers in constant factor results are given in the same units as their base variable. If you choose to use a custom unit label, the label will not change to reflect the units the model actually gives the results in. For example, as shown in **Figure 28**, if, in a forecast that displays jobs in thousands, you display a constant factor result with an Employment base variable and units that you have named "Number of People," the model will give the custom result in thousands, but the units will be labeled "Number of People." As shown in **Figure 29**, you will have to change the forecast's display units or rename the units label for the results and units label to match. Constant factor results without a custom units label will display with the same label as their base variable, which will change to match the units in which results are given.

Category	Units	2018
Adjusted Employment	Number of People	1.840
Employment	Thousands (Jobs)	1.840

Figure 28: Constant Factor Result Displayed with Jobs Given in Thousands

Category	Units	2018
Adjusted Employment	Number of People	1840
Employment	Individuals (Jobs)	1840

Figure 29: Constant Factor Result Displayed with Jobs in Given in Individuals

As shown in **Figure 30** and **Figure 31**, neither the units labels nor the units in which custom equation results are given will change to match settings in the forecast. For example, a custom equation where Output in billions of fixed 2012 dollars is divided by Employment in thousands will give results in billions divided by thousands with the units label "Billions of Fixed (2012) Dollars per Thousands (Jobs)." If you change the forecast settings to display currency in millions, neither the numbers nor the units label in the custom equation result will change.

Category	Units	2018
Output per Employee	Billions of Fixed (2012) Dollars per Thousands (Jobs)	0.045
Output	Billions of Current Dollars	0.084

Figure 30: Custom Equation Result with Currency Units Set to "Billions of Current Dollars"

Category	Units	2018
Output per Employee	Billions of Fixed (2012) Dollars per Thousands (Jobs)	0.045
Output	Millions of Current Dollars	84.404

Figure 31: Custom Equation Result with Currency Units Set to "Millions of Current Dollars"

Model Details

The fourth section of the TranSight Home Window is the Model Details screen. This area contains a variety of detailed data as well as other information like lists of all possible variables, your model region layout, industry sectors, occupations, and commodities.

Figure 32: Model Details

Model Parameters

The Model Parameters window displays the values of all parameter constants used in REMI's equations for your specific model. The window is arranged so that each model equation has its own tab containing all relevant parameters. Descriptions are provided to explain the significance of each parameter in its equation.

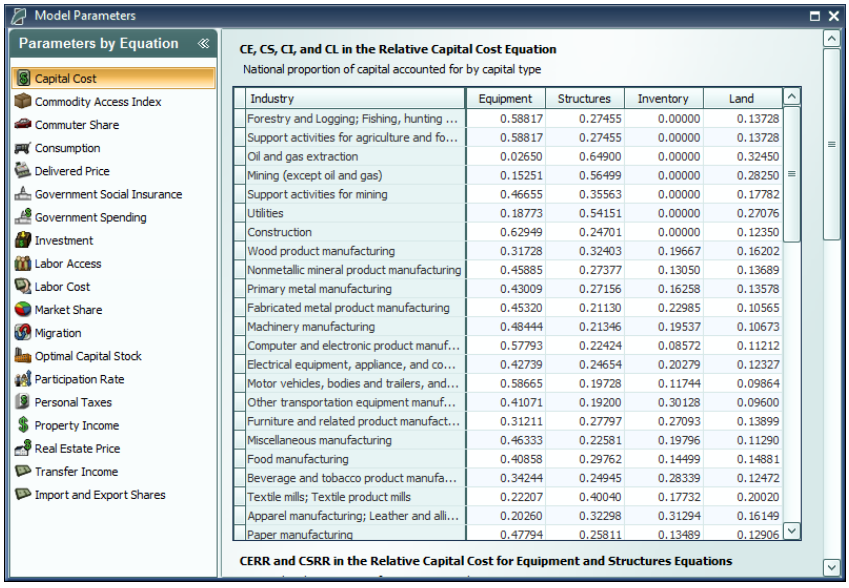


Figure 33: Model Parameters

Help Center

The final section of the home window is the Help center. Here you will find several useful sources of information that can help answer questions about the TranSight software or the

underlying REMI model.

Figure 34: Help Center

Software Information

The **About** window displays information about your installation of TranSight. It contains version, model, and build ID numbers as well as information that could be useful for a REMI support situation such as information about applied patches and some statistics pertaining to your computer's memory usage.

Frequently Asked Questions

The FAQ window contains answers to common questions about using TranSight. Questions and answers are grouped by topic and provide insight into important REMI model concepts, detail some best-practices for policy variable usage, explain the options available when running a forecast, and give tips for troubleshooting errors.

Documentation

The documentation viewer is a built-in PDF viewer that provides easy access to all documentation files that are shipped with your model. Documentation is organized into different sections for version change documents, equations and data, examples of use, etc. From the documentation viewer, you can print as well as easily open our Documentation folder if you'd like to copy or share our documentation files. Specific documentation pieces that are worth noting are the **Major Changes** file, which briefly outlines a history of major changes between TranSight versions, and the **Model Overview** file which provides an in-depth description of data, software, and methodology changes made for the current version. The rest of our documentation focuses on REMI's model equations, data sources, and estimation procedures.

III. Overview of Forecast Windows

The process of creating a forecast takes place within a Forecast Window. The three main aspects of working with a forecast: specifying policy variables, running the forecast, and viewing the results, each take place on separate screens of the Forecast Window and are accessed using the navigation links along the window's header panel. At any time, your forecast and its contents such as policy variables and customized result visualizations can be saved using the **Save Forecast** button which is always located at the upper left of the screen on the header panel. Forecast windows are now separate entities from the main application window and thus multiple forecasts can now be opened simultaneously, with each accessible via a button on the Windows taskbar. Inputs Search Function is added to search for variables, details, topics and scenarios.

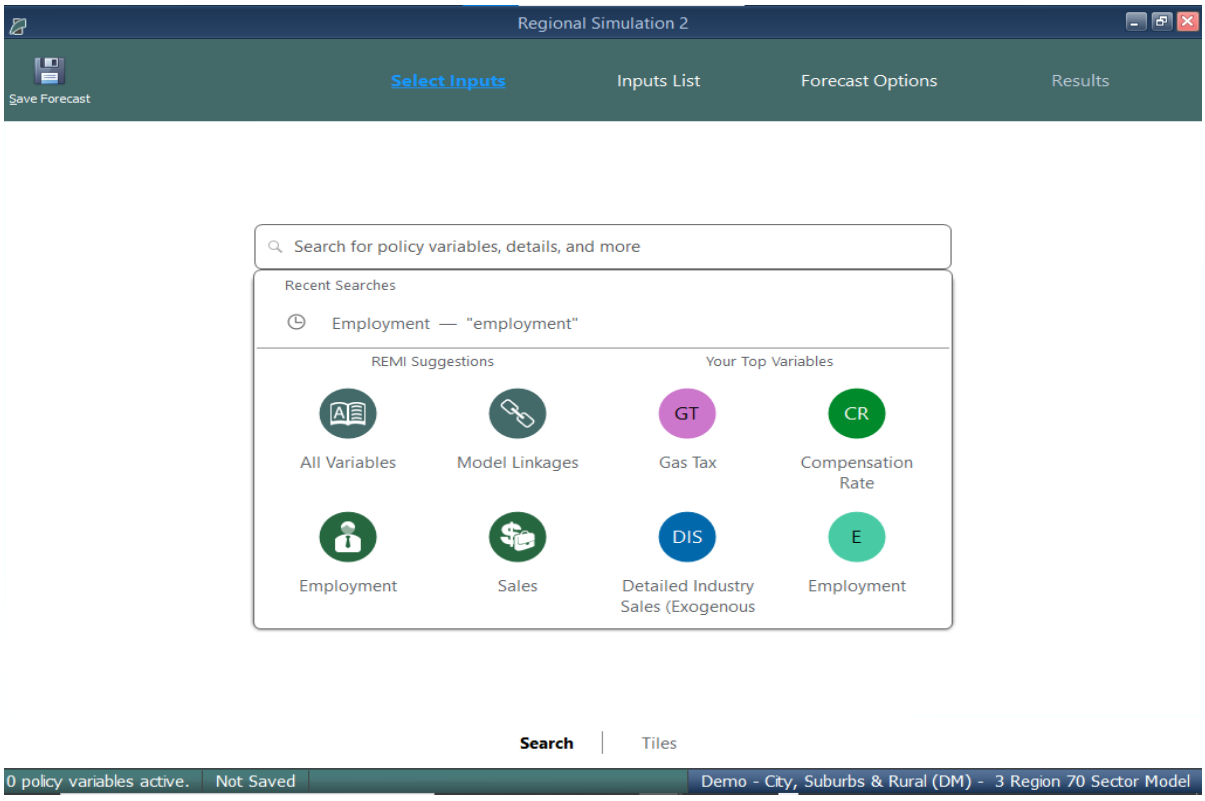


Figure 35: Forecast Window

Select Inputs

The first screen that will be visible when creating a new forecast is Select Inputs (shown in **Figure 35**). This interface is the jumping off point for choosing what policy variables to add to the forecast. The search bar feature simultaneously searches for policy variables and their details, topics, and scenarios to help you quickly find what you are looking for. An update to the search

function allows you to have your most used variables ready at hand, as shown in the figure. This feature also uses your search to bring up REMI suggestions, with many different variables for employment coming up if you type 'Employment', for example. You can also switch to the Tiles menu either through clicking it at the bottom of the screen or setting it as your main selection menu in the More Preferences settings menu. Each tile represents some number of policy variables which will be opened in the Policy Variable Selector, whether it is a single variable like in the case of the Employment tile or a group of related policy variables like with the Business Costs or various Scenario tiles. At the forefront of the input selection screen, the Featured section highlights variables and topics that are likely to be used most often. Alternatively, the Model Linkages and Model Blocks tiles offer ways of accessing policy variables by area of the REMI model structure where they fit in. If you'd prefer to see all variables that are available for your forecast, the Full List tile will open all variables in the Policy Variable Selector.

If there are certain policy variables that you are likely to frequently use together and they are not already grouped by one of REMI's scenarios, you might consider using the Custom Scenario editor to build your own. This editor, found under the **More Scenarios** tile by clicking **Custom Scenarios**, allows for creating multiple groups of policy variables where each variable can also have its list of details filtered down to remove ones that won't be useful. The custom scenario can be given a name, description, and saved using the controls on the editor. Saved custom scenarios are given their own tiles in the **Custom Scenarios** section of the Select Inputs screen.

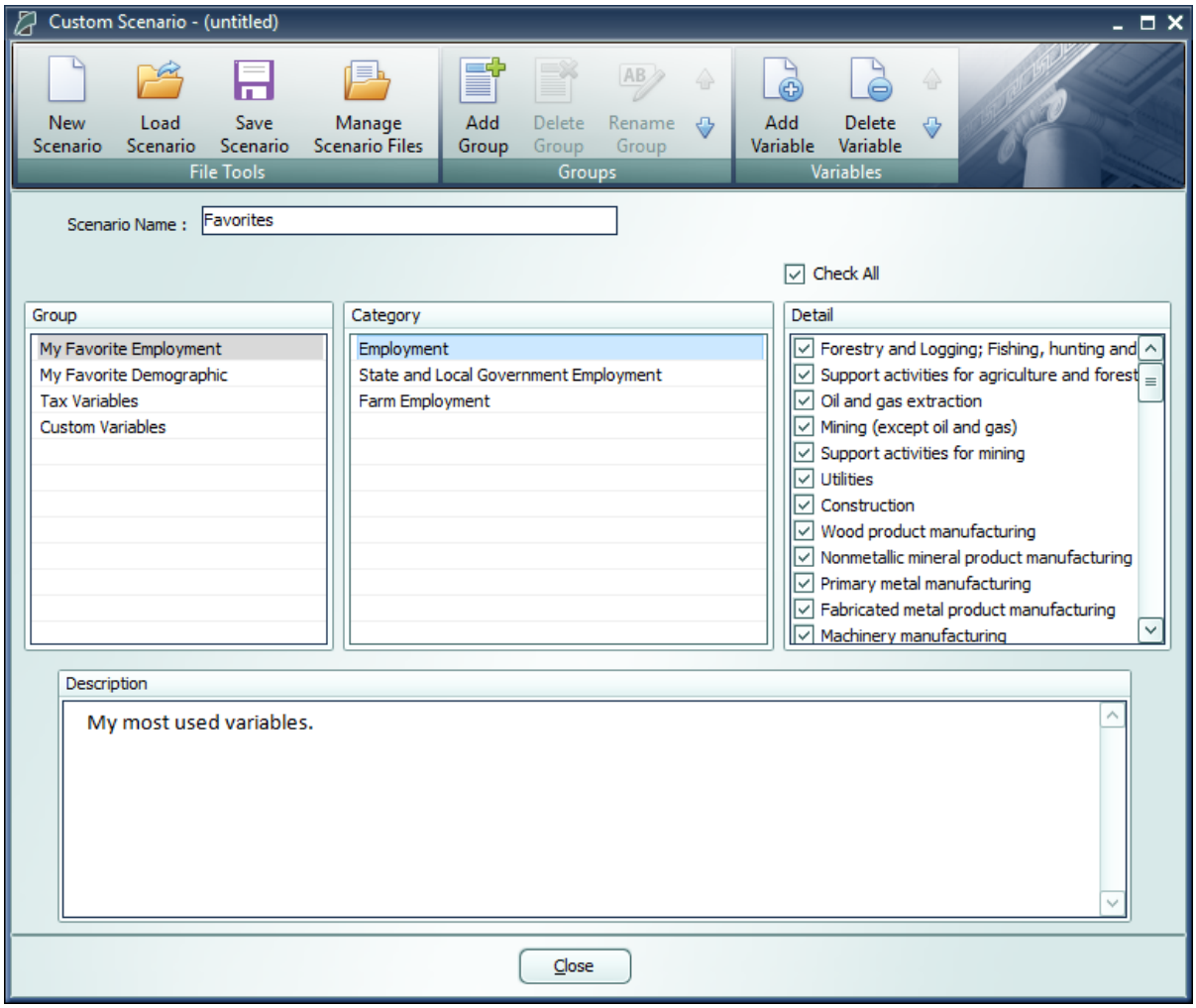


Figure 36: Custom Scenario Editor

In order to make your most-used policy variables and custom scenarios even more accessible, you can make use of the Favorites section. Right-clicking any tile will save it to your Favorites (indicated with a star), where they can then be dragged into any customized order.

Policy Variable Selector

Clicking on a tile that represents some number of policy variables will open up the Policy Variable Selector window. This window is split into three tabs (**Variables**, **Details**, and **Edit Values**) that each represent a step in the process of defining exactly how your policy variables will enter into the model. At any time, you can name your policy variables using the editor at the top of the window. You can also click the **Scenario Info** button to see a description of the scenario you have open.

The first tab on the Policy Variable Selector contains the variable list. This screen is where an individual policy variable is selected for editing. The contents of the variable list are determined by what group of variables was previously chosen. Only one variable can be selected for editing at a

time, but once you finish creating a variable, you can always go back to the variable list tab to start working with another. In cases where you accessed the Policy Variable Selector using a tile that represents just a single variable, this section will be skipped since there is no selection to be made. If the number of available variables is large, it may be helpful to use the search field for filtering the list down by variable name or description. The bottom left buttons also allow for toggling the list of policy variables between the current scenario, the full list in alphabetical order, and the full list grouped by concept.

Clicking a variable in the list will display information about it and its options. In some cases, a diagram may be available that depicts how the selected policy variable interacts with other variables and how it fits into the REMI model. Once you have decided what variable to choose, clicking the **Select** arrow button on the window's header panel will move the variable to the Details tab to begin editing.

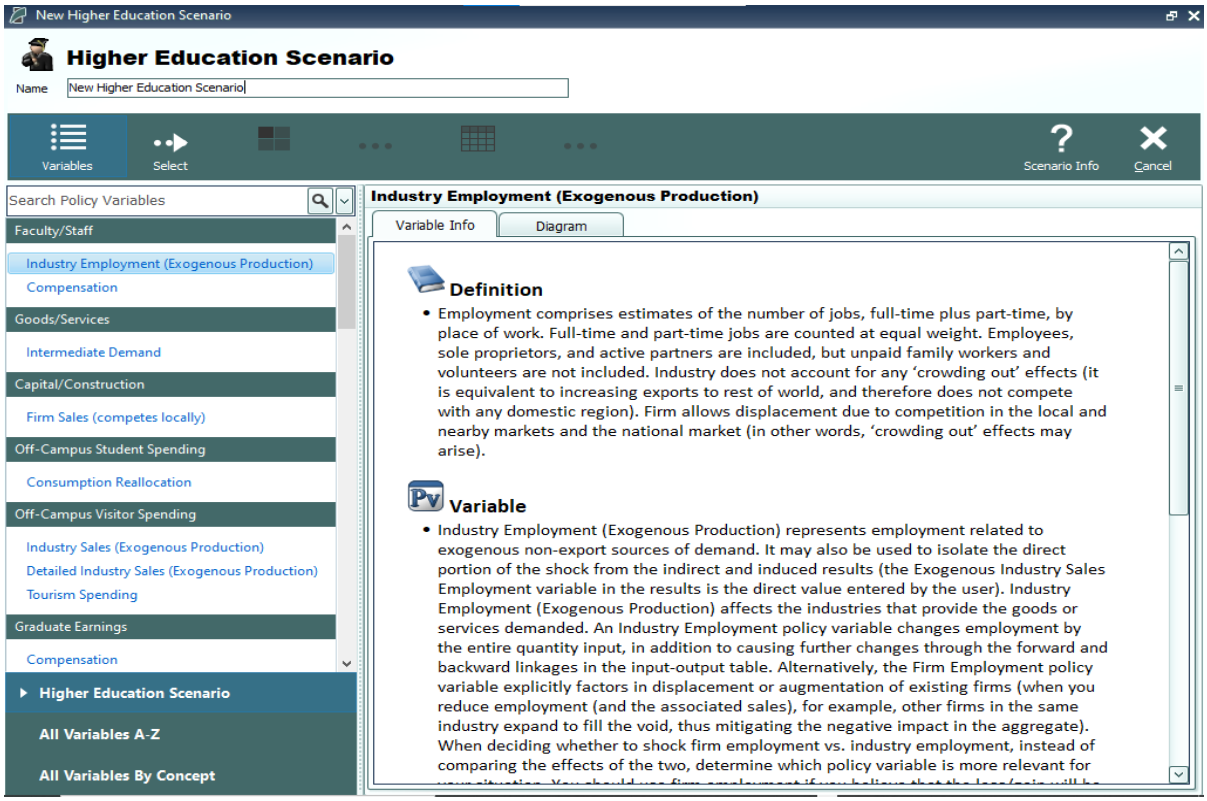


Figure 37: Policy Variable Selector – Variable List Tab

The Details tab is where you specify what the exact form of the policy variable should be. Different variables have different sets of details that must be filled out before the variable can be added to your forecast. Each type of detail information that must be specified will be represented by a tile on the left-hand side of the screen. Clicking one of these tiles will allow you to fill out some information describing your policy variable and can be done in any order. Most policy variables will require you to at least specify the regions it should affect and the unit type of the values. In the specific case of the Employment policy variable, shown below in **Figure 38**, option and industry details are also required. Options only exist on some policy variables, they allow for

choosing exactly how the variable should interact with other parts of the model. Selecting industry details for the Employment variable depicted below controls what industries will be impacted by the policy variable's changes to employment levels.

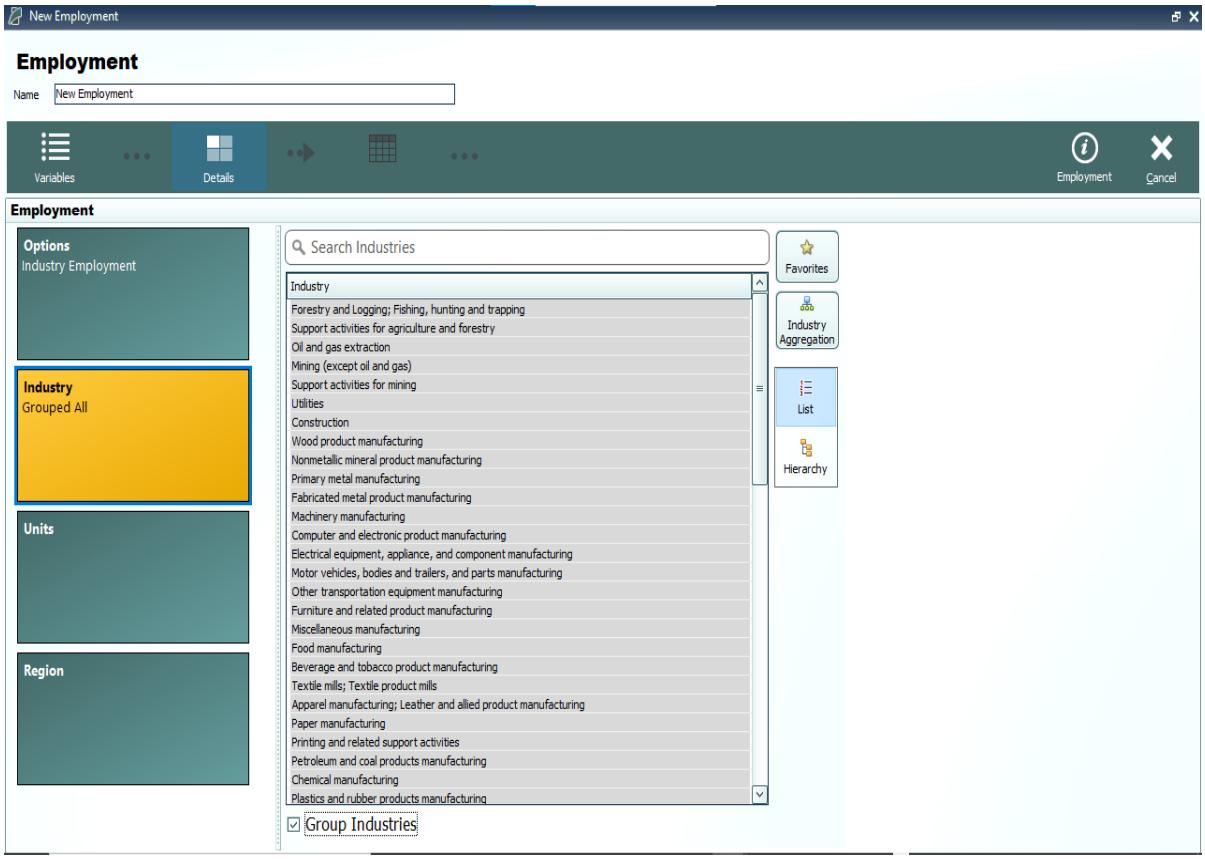


Figure 38: Policy Variable Selector – Details Tab (In Progress)

There are several ways to select specific details from the various types of detail lists, which include regions, industries, commodities, occupations, and ages. The first way is to select them from the simple flat list view. Hold down the Ctrl key to select multiple details one at a time or Shift to select a range of details all at once. If you would like to apply the same policy change to multiple details, it is helpful to check the **Group Industries** or equivalent checkbox below the detail list. This will put all of the details into a single variable rather than creating separate variables for each selected detail.

Another way of selecting details is to use the hierarchical view. Simply click the **Hierarchy** button to the right of the detail list to see a hierarchical tree structure with checkboxes as the selection mechanism. This view is useful for selecting multiple related details all at once. For example, you could check the **Manufacturing** tree item to capture all manufacturing sub-industries. The final way to select details is to click the **Aggregation** button and select a custom or pre-defined aggregation, discussed in the **Aggregation Manager** section. Selecting an aggregation will repopulate the flat and hierarchical detail lists with the aggregated detail groups contained within the chosen aggregation. Similar to the detail grouping checkboxes, creating a variable with an aggregated

detail will cause the inputted year values to be spread among the individual regions, industries, commodities, occupations, or ages as it enters the model.

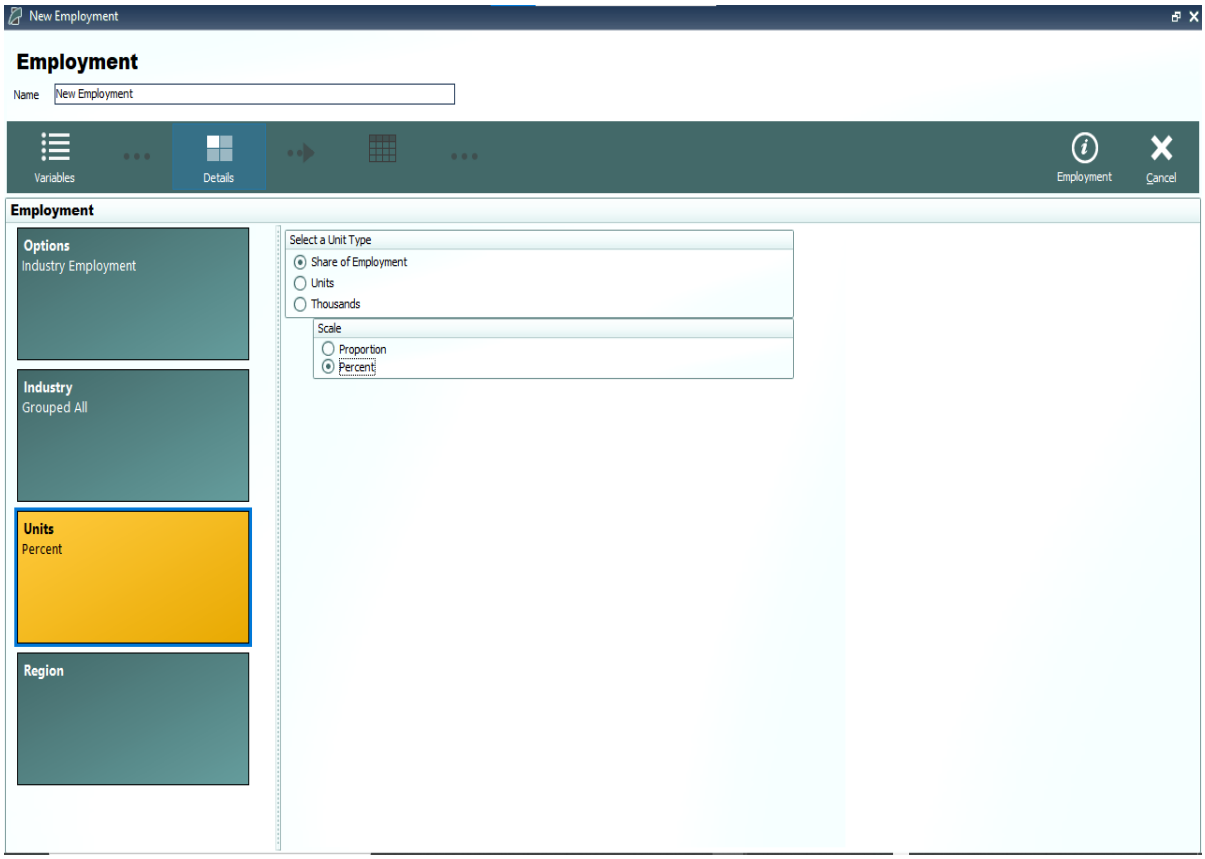


Figure 39: Policy Variable Selector – Details Tab (Completed)

Once the unit type and the rest of the options on the policy variable have been specified, you will be able to click the **Add to Editor** button to move the variable into the value editing spreadsheet. The number of created policy variables will be displayed as a badge on the **Edit Values** button that becomes enabled once at least one variable has been added. One policy variable will be created and added to the spreadsheet for each combination of details specified on the Details tab. If you chose to check any of the grouping check boxes or chose to use aggregations, then all of those grouped details will be combined into one variable, which is depicted below for the industry dimension.

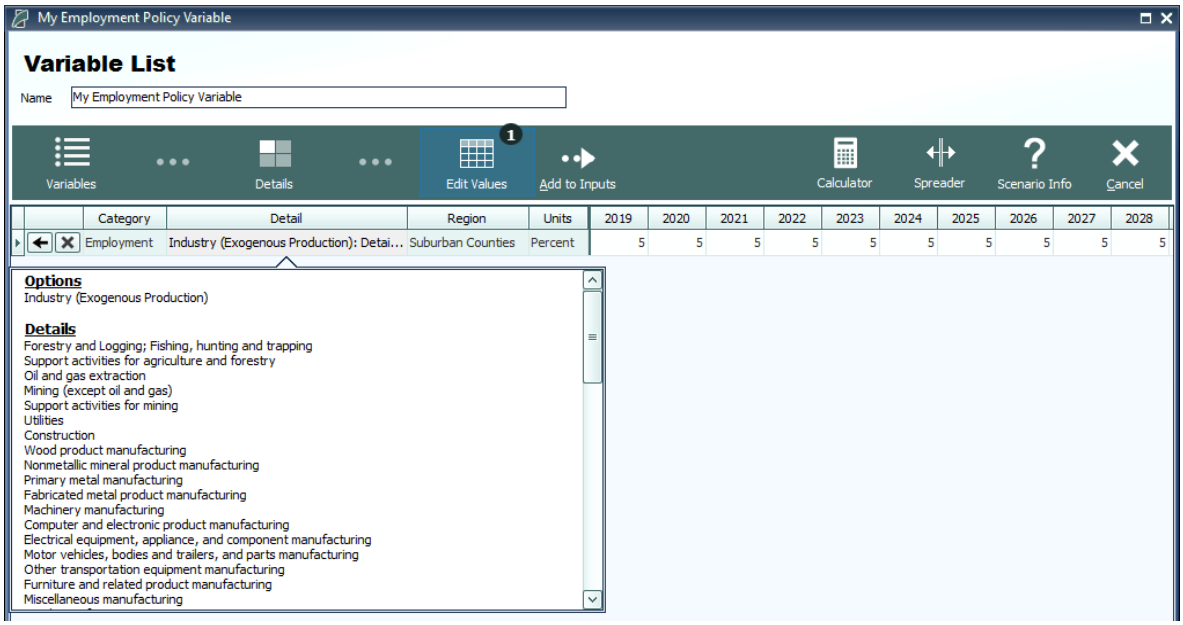


Figure 40: Policy Variable Selector – Value Editor

The editor will allow you to input values for each policy variable in each year. You can change the region and units by clicking on those cells in the spreadsheet, which contain combo-box editors. The Calculator and Spreader tools located on the top right of the navigation panel are useful for inputting more complicated series of values. If you need to change more options on your variable, you can click the **Redefine Details** button marked with a left-facing arrow. Variables can be deleted using the adjacent button that is marked with an "X". Once finished, add your variables to the forecast's Inputs List screen by clicking the final arrow button, **Add to Inputs**. Submitted variables will appear on the Inputs List together in a group with the name specified on the Policy Variable Selector.

Custom Variables

There are a handful of special policy variables available only to regional simulations that are known as custom variables. These variables are much more customizable than regular policy variables because they allow for modifications to be made to the input-output (IO) table data that dictates how the variable will affect different parts of the economy within the model. There are custom variables for Industry Output/Sales, Government Spending, Investment Spending, Consumer Spending, Imports, Exports, and Tourism Spending. These variables can be found under the **Custom and Detailed Variables** tile in the Featured section of the Select Inputs screen and also can be added to a custom scenario. Custom variables can be created, edited, and deleted from the Policy Variable Selector's Details tab once a particular type of custom variable has been selected. Creating a new custom variable opens the Custom Variable Editor, which looks slightly different and has various options depending on which type of custom variable is being created.

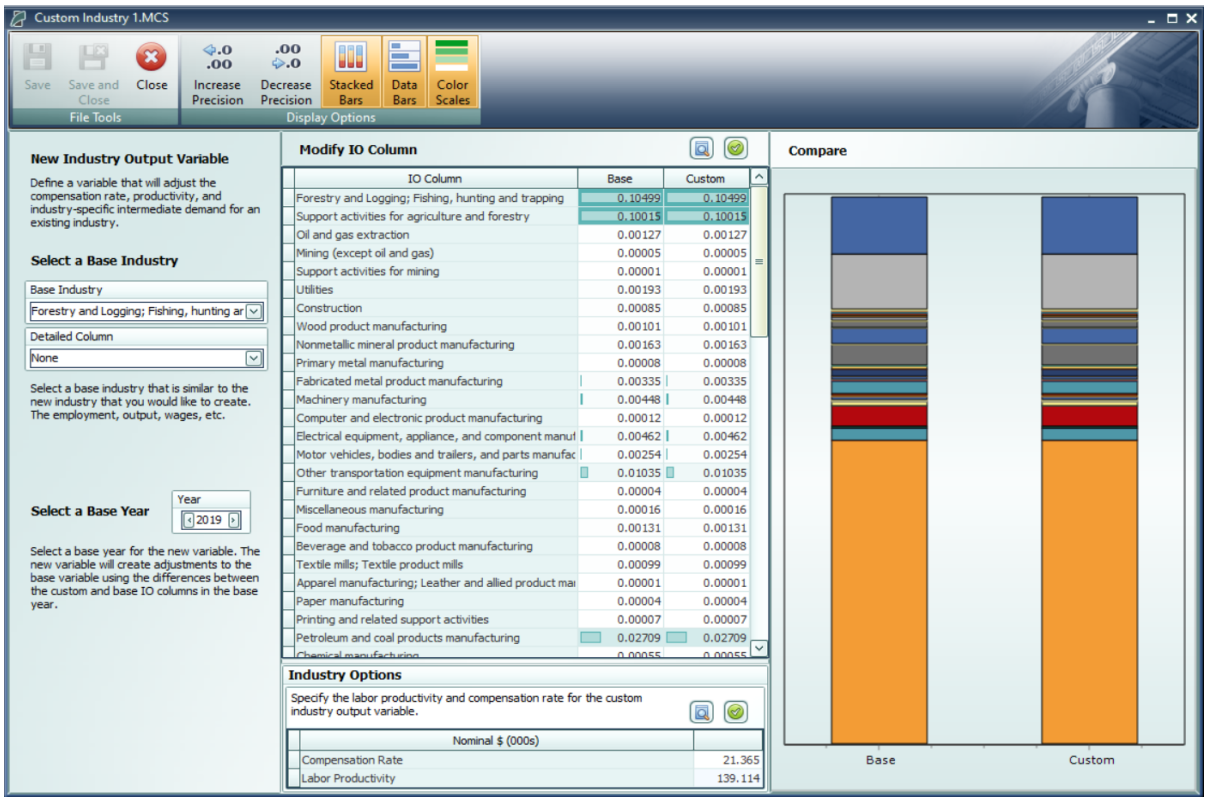


Figure 41: Custom Variable Editor – Industry Output/Sales

On the left-hand panel of the Custom Variable Editor are variable-specific options and instructions. These options typically involve specifying information about what base data you would like to associate with the custom variable such as the base year, base industry, commodity or government spending category, and so on. The base IO column data resulting from your choices is what you are able to subsequently modify using the central IO Column editor in order to finish specifying the custom variable. Additional customizations are available for certain types of custom variables, such as the options for adjusting compensation rate and labor productivity of custom industries, as shown in **Figure 41**.

To aid in constructing your custom IO column, the stacked-bar chart on the right-hand side of the screen helps visualize the differences between the base and custom IO columns. And you will be able to choose data bars or color scales to automatically categorize the IO column into low, mid-range, and high categories. Additionally, using the button marked with a magnifying glass in the IO column editing area, IO column reference data for each forecast year can be viewed as a table or chart and can be auto-filled into the custom column editor. The Custom Industry Output/Sales variable editor also has reference information for national and regional compensation rates and labor productivity. The right-click menu of the custom column editor has an **Apply Remainder** option (except when editing Industry Output/Sales, for which Value Added captures the remainder), which can prove useful as the IO column needs to total to one. If there are issues with any of your custom values, the button usually displaying a green checkmark in the corresponding

section of the editor will change and instead warn you of the problems with what you have entered.

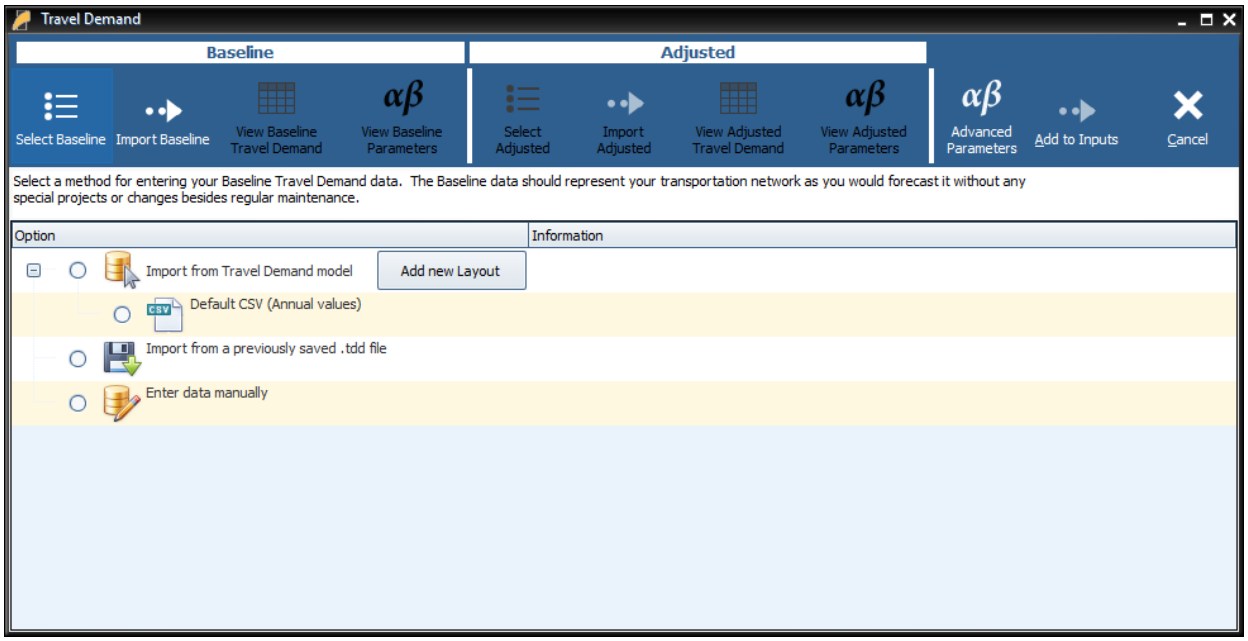
Once you have finished your custom variable, simply save it and subsequently use it as you would a normal policy variable. Saved custom variables appear in the Details tab of the Policy Variable Selector once you have selected that same category of custom variable. Be aware that custom variable files should not be transferred between versions of TranSight because each new release includes an updated IO table. This means that the values you attached to the custom variable will vary from the base data not only in the way that you intended them to, but also due to our updates affecting the base IO table.

Travel Demand Manager

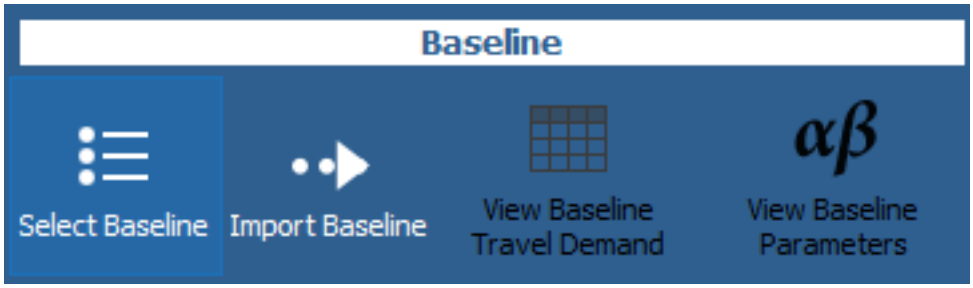
In REMI TranSight, you can begin modeling a transportation scenario using data originating from an exogenous travel demand model (or entered manually) by clicking on Travel Demand in the forecast navigation screen. The Travel Demand Manager helps you specify transportation inputs for your simulation.

The Travel Demand Manager allows data from travel demand models to be entered into TranSight as simulation inputs. You can enter Baseline and Adjusted Simulation data; the Baseline Simulation is the “no-build” scenario forecasting what will happen without the proposed changes, while the Adjusted Simulation is the “build” scenario forecasting what will happen if the changes occur. You can also apply different parameters to the Adjusted Simulation data, such as lower accident rates to reflect a build scenario that would also bring safer traffic conditions.

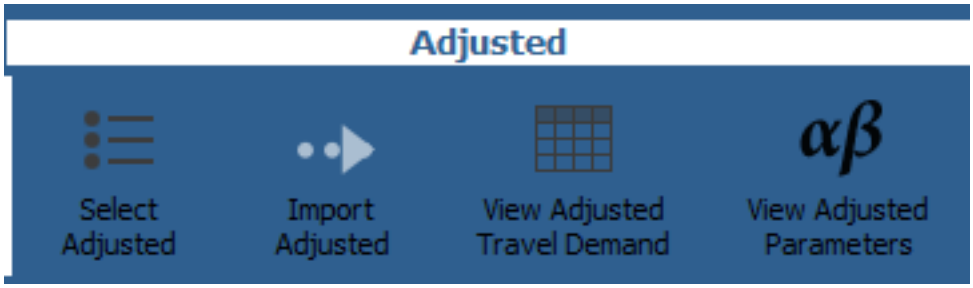
It is also possible to use the same data for the Baseline and Adjusted Simulations and simply make Parameter Changes to see the impact it would have on your existing network.



There are 3 options for inputting travel demand data into REMI: importing the data from a travel demand model's output (if the output is in the form of a CSV Excel or DBF file,) importing the data from a previously saved travel demand (.tdd) file, or entering the data manually. Select any of the three options and click **Import Baseline** on the top bar of the manager. The three following sections guide you through what happens when you click each of the three options. All three options involve using the Baseline Travel Demand toolbar in the top left of the manager.



All three options also involve repeating the process for your adjusted travel demand data using the Adjusted Travel Demand toolbar to the right of the Baseline Travel Demand toolbar. The Travel Demand Manager for your adjusted data will appear when you click **Select Adjusted**.



If you wish to use the same travel demand data for your baseline and adjusted scenarios or lack, select the **Copy Values from Baseline** option on the Travel Demand Manager for your adjusted data. You can select different options for inputting your baseline and adjusted data (e.g., you can import your baseline data and enter you adjusted data manually.)

Import from Travel Demand Model

If you select this option, TranSight can automatically read travel demand data in a CSV Excel or DBF file.

1. Select **Import from Travel Demand model** from the options on the Travel Demand Manager.
2. Select the source layout of the file to be read (see the **Layout Editor** section for instructions on creating and using source layouts.)
3. Click **Import Baseline** on the Baseline Travel Demand toolbar.
4. Navigate to the folder containing your simulation data.
5. Select it and click the **Open** button.

   Note: If selecting a folder you may need to select one of the files within the folder for the import to work. TranSight will then convert the data into a format it can use.

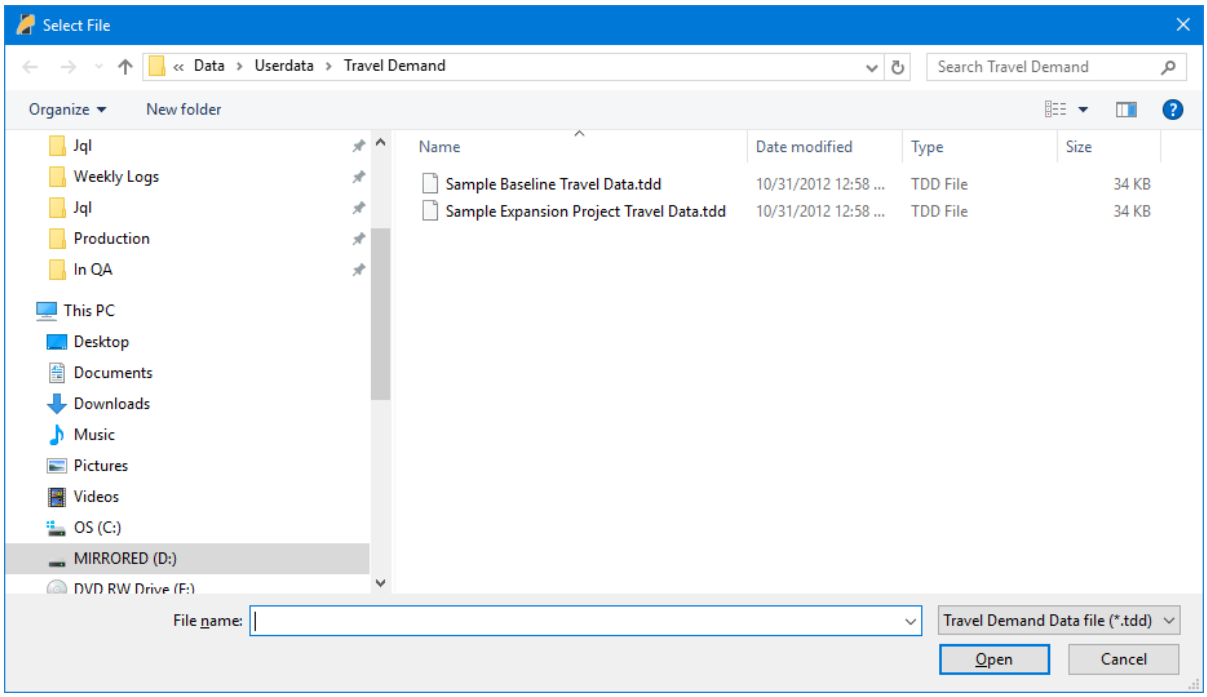
   Note: For some import types further information on how to phase in the data between the baseline and adjusted may be needed. If that is the case, after selecting the file(s) to be imported you will be prompted to enter that data before you can continue.

6. Review and make any adjustments to your travel demand data in the **Travel Demand Viewer** for your baseline (see the **Travel Demand Viewer** section for instructions on navigating and entering data.)
7. You can also review and adjust or import other travel parameters such as leisure time value, fuel costs, and emission rates by clicking **View Baseline Parameters**.
8. Begin entering your adjusted travel demand values by clicking **Select Adjusted**.

   Note: If you lack an Adjusted scenario with your Travel Demand data, you can also click the **Copy from Baseline** button and manually adjust the values. Right-clicking the table and using the **Calculator** can aid in the process.

Import from a Previously Saved .tdd File

Select this option on the Travel Demand Manager and click **Import Baseline**. Similarly to the steps in the **Import from Travel Demand Model** section, File Explorer will open, where you can navigate to your .tdd file, select it, and click **Open**. You will be navigated to the **Travel Demand Viewer** for your baseline data. (See the **Travel Demand Viewer** section for instructions on navigating and entering data.) You can also review and adjust or import other travel parameters such as leisure time value, fuel costs, and emission rates by clicking **View Baseline Parameters**.



Begin entering your adjusted travel demand values by clicking **Select Adjusted**.

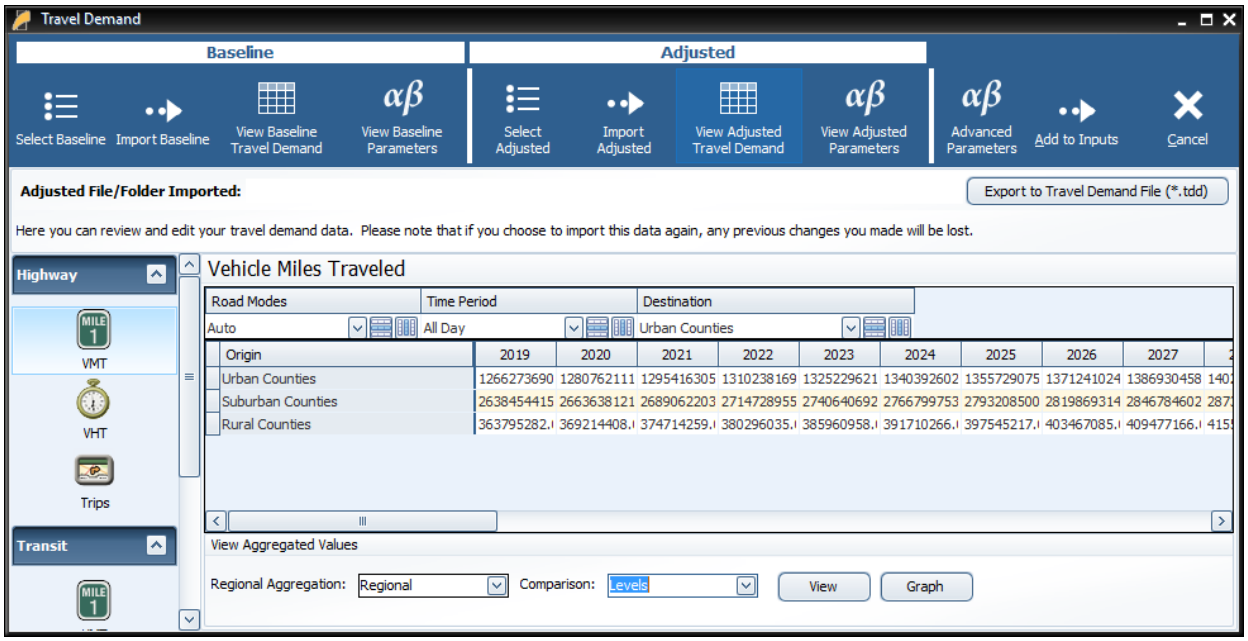
Enter Data Manually

If you select this option on the Travel Demand Manager, you will be navigated to the **Travel Demand Viewer** for your baseline data after you click **Import Baseline**. All values will be set to 0 by default. You can edit values by typing them in manually or by copying and pasting from an outside spreadsheet. (See the **Travel Demand Viewer** section for instructions on navigating and entering data.) You can also review and adjust or import other travel parameters such as leisure time value, fuel costs, and emission rates by clicking **View Baseline Parameters**.

Begin entering your adjusted travel demand values by clicking **Select Adjusted**.

Travel Demand Viewer

When **View Baseline Travel Demand** or **View Adjusted Travel Demand** are selected in the Travel Demand Manager, the Travel Demand Viewer for your baseline or adjusted data will be shown.

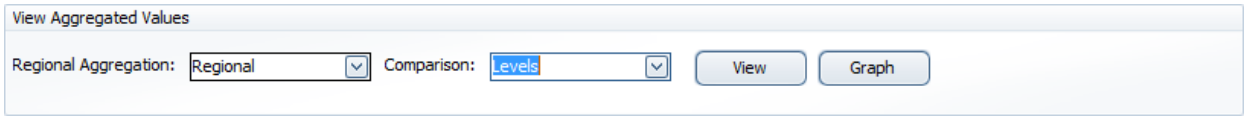


The Travel Demand Viewer shows grids of the travel demand data you have entered. The grids are organized by highway or transit travel and by VMT, VHT, or Trips. You can filter your data by selecting from the drop down menus above the grid. You can move a dimension (origin, destination, time period, year, etc.) into a grid's rows or columns by clicking the **Move to Rows** or **Move to Columns** buttons (marked by a small blue horizontal and vertical line, respectively) next the drop down menu for that dimension. The dimension that was already in the rows or columns will be placed in a new drop down menu. You can also use a Pivot Manager to select a row and column for your grid by right-clicking on any data cell in the grid and clicking **Pivot Manager**.

You can export your travel demand data to a .tdd file by clicking **Export to Travel Demand File (*.tdd)** in the upper right corner of the viewer. You will be able to save the file and import it later to recreate the travel demand inputs by selecting **Import from a Previously Saved .tdd File** in the Travel Demand Manager.

Viewing Aggregated Values

You can view charts or graphs of your travel demand values by selecting a regional aggregation and a comparison type from the tool at the bottom of the Travel Demand Viewer and clicking **View** or **Graph**, respectively.

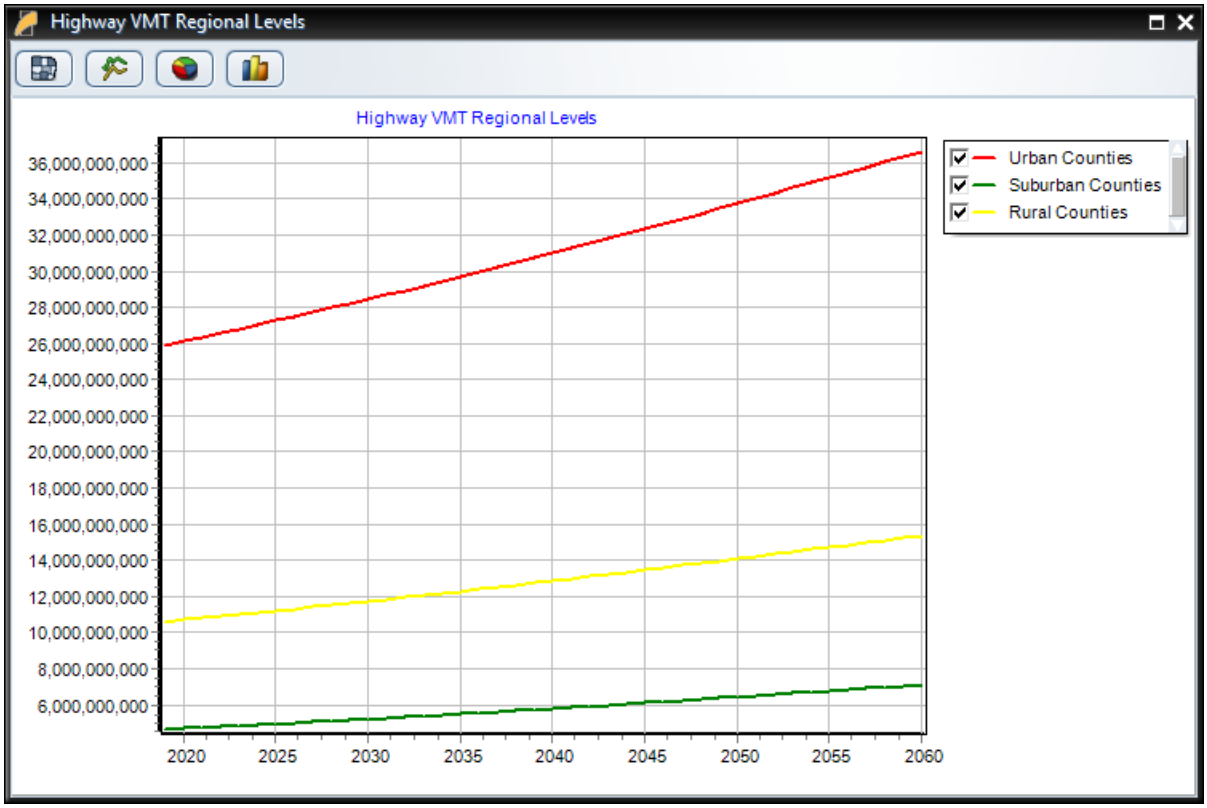


The chart or graph that appears will show only the data type that is currently on the viewer (VMT, VHT, or Trips for highway or transit.) The **Regional** aggregation mode will sum up the relevant

travel data by origin region. The **Region-to-Region** mode will show the travel data by origin and destination region, and the **Total** mode sums data from all regions.

You can use the **Levels** comparison to view charts or graphs of the values in your travel demand data. You can use the **Differences** and **Percentage Change** comparison to view charts of graphs of the differences or percent differences between your adjusted and baseline travel demand data, respectively.

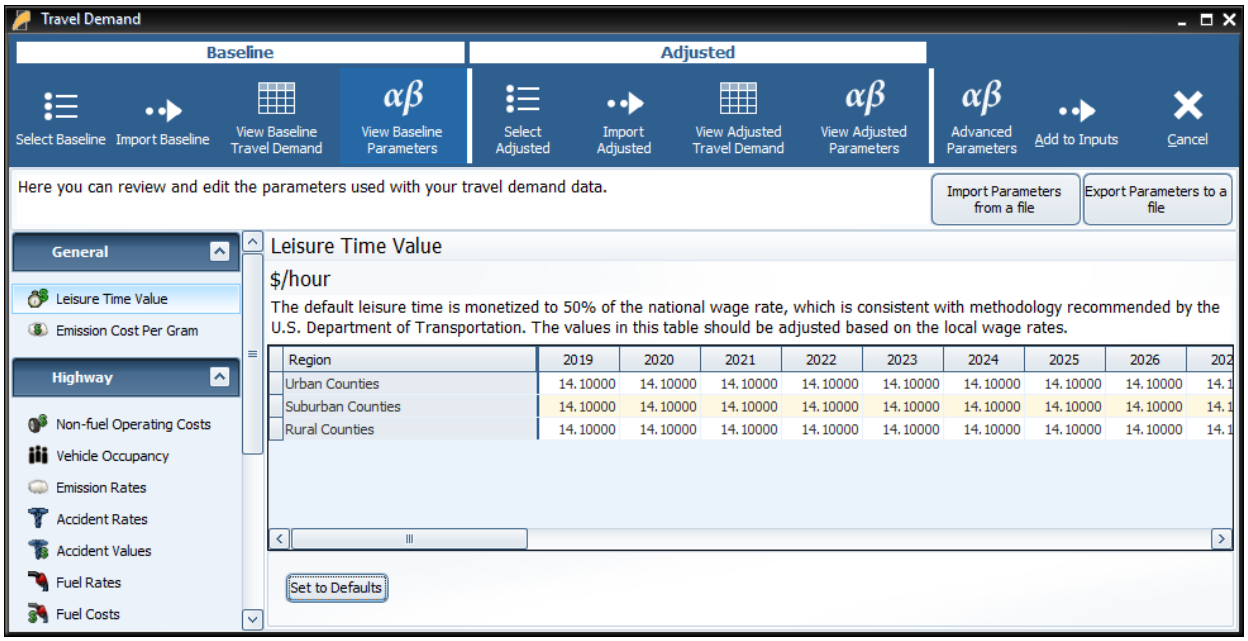
When viewing a graph, you can use the top buttons on the graph as shown below to change the graph type to a color-coded map of the impacts, a line chart, a pie chart, or a bar chart, respectively.



Right-click on a desired chart and select **Copy** to copy an image of the chart to the Clipboard; you can paste it into a graphics program such as Paint or Photoshop.

Parameters Viewer

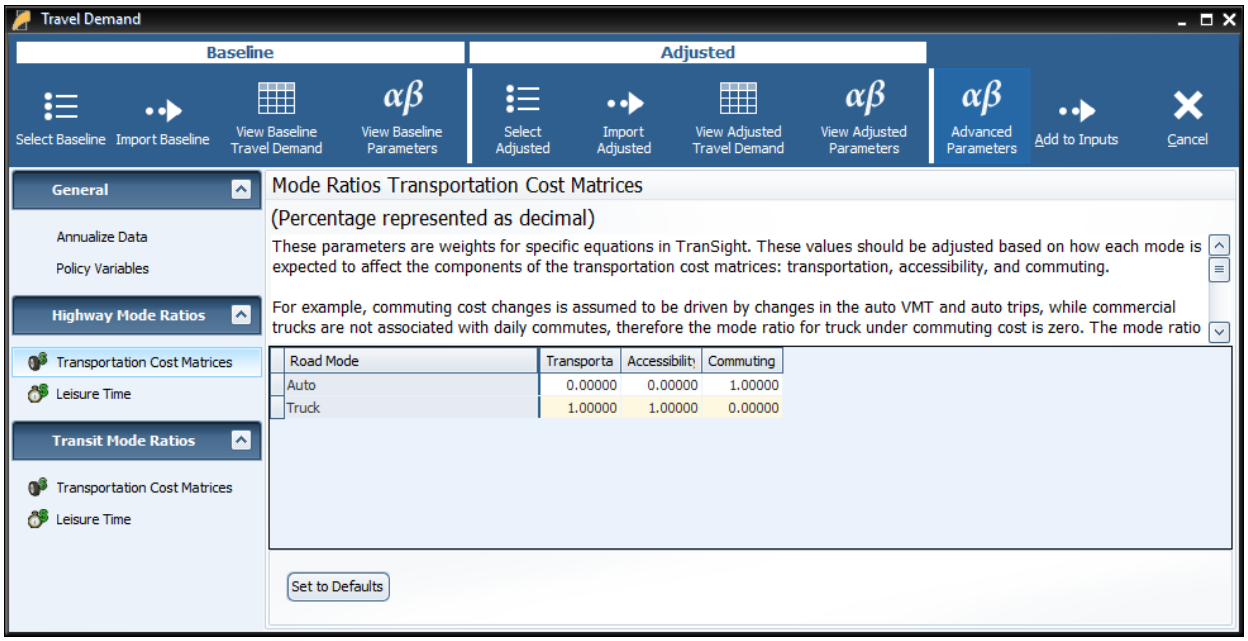
By clicking on **View Baseline Parameters** or **View Adjusted Parameters** in the Travel Demand Manager, you can access the Parameters Viewer for your baseline or adjusted travel demand inputs, where you can view and edit other travel parameters such as leisure time value, fuel costs, and emission rates for highway and transit travel.



You can save these parameters for use in other forecasts by clicking **Export Parameters to a File** in the upper right corner of the viewer. You can load files saved this way by clicking **Import Parameters to a File**. You can reset the parameters you are currently viewing to their default values by clicking **Set to Defaults** at the bottom of the viewer.

Advanced Parameters Viewer

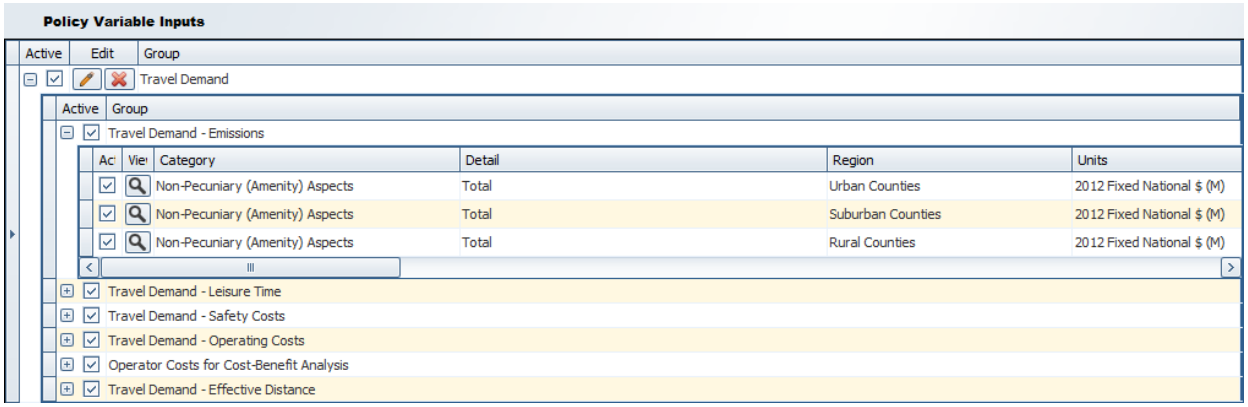
You can access the Advanced Parameters Viewer by clicking **Advanced Parameters** on the top bar of the Travel Demand Manager. You can use the viewer to make some adjustments to how travel demand inputs enter the model, including scaling how changes in travel demand for each travel mode affects Transportation, Accessibility, and Commuting costs in the model.



Add To Inputs List

When you're ready to add the Policy Variables created in the Travel Demand Manager to the model, click the **Add to Inputs** button. You should now notice that the policy variables list has been filled with a **Travel Demand** policy variable group under which you can find the following groups of policy variables:

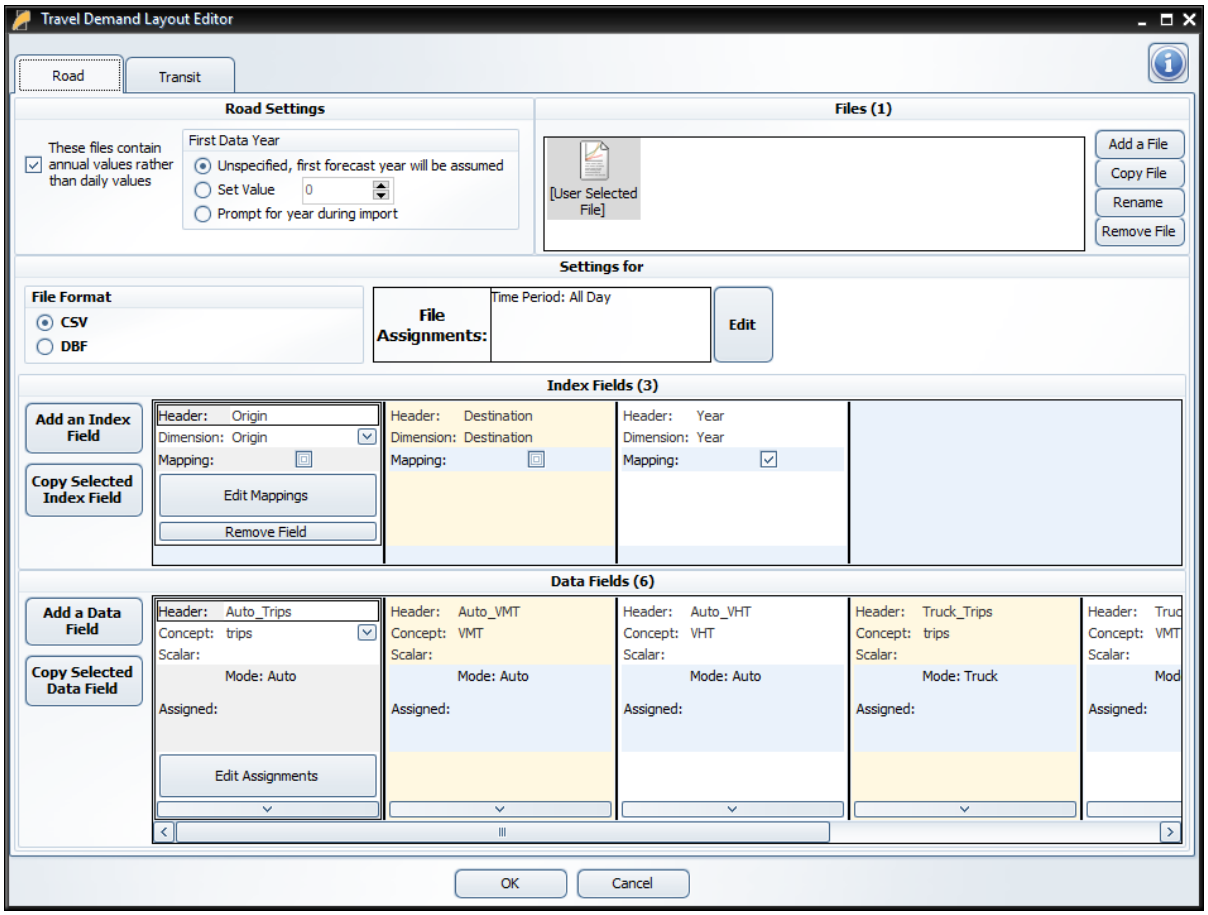
- **Emissions:** The change in pollution-related health costs (summed across the five major motor-vehicle pollutants) due to the change in VMTs caused by the transportation project. The Amounts tab shows the change in grams of emissions (for each of the five pollutants) due to the change in VMTs.
- **Leisure Time:** The value of leisure time either saved or lost due to the change in VHTs caused by the transportation project. A negative number on this table represents time (and cost) savings for that region.
- **Safety Costs:** The change in accident-related costs (including health and the value of lost life) due to the change in VMTs caused by the transportation project.
- **Operating Costs:** The change in fuel costs and non-fuel costs due to the change in VMTs caused by the transportation project (non-fuel costs include such factors as vehicle maintenance).



Note that no changes to either policy variables or values may be made here, except to activate or deactivate them by unchecking/checking the box.  Only active variables will be included when the simulation is run. This option makes it easy to run multiple simulations with different combinations of variables included. Doing so isolates the direct impact of individual variables.

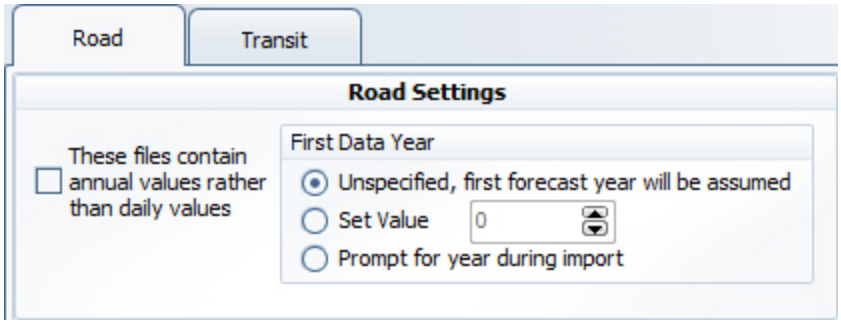
Using the Layout Editor

By clicking **Add New Layout** in the Travel Demand Manager, you can use the Layout Editor to define how the three primary travel demand concepts VMT (Vehicle Miles Traveled), VHT (Vehicle Hours Traveled) and Trips are laid out within your travel demand model's output. Below is a step-by-step guide to using the layout editor to create a travel demand layout.



Step 1: Pick a mode & specify settings

Choose the transportation mode your data is for, either Road or Transit using the tabs at the top of the screen. If you have data for both, simply choose one to start with.



Annual Values

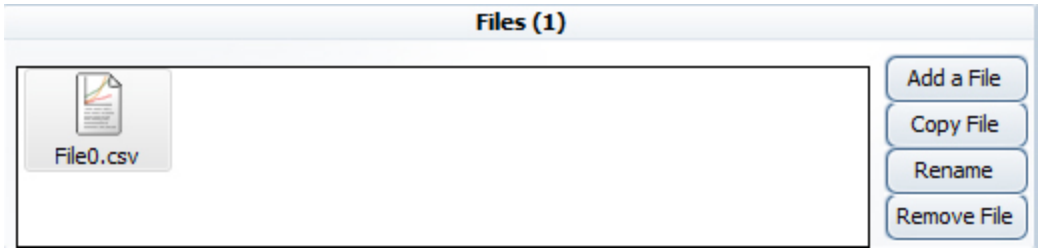
You will need to specify here whether the data in the files associated with this mode are annual values or daily values using the checkbox below. If the box is not checked then the values you supply will be scaled to annual numbers based on a formula that assumes the values you provided for weekdays and reduced traffic values for weekends.

First Data Year

- **Unspecified** so TranSight uses the first forecast year in the model as a reference point.
- If you intend to use this in future TranSight models with a different Last History Year, you will need to use **Set Value** unless the **Index Field** that specifies the **Year** dimension is set to use a **Lookup** mapping. You should always use **Set Value** if you intend to provide travel demand data in years earlier than the first forecast year in the model.
- If you intend to only specify a layout for only a single year of history, it may be best to **prompt for the year during import**.

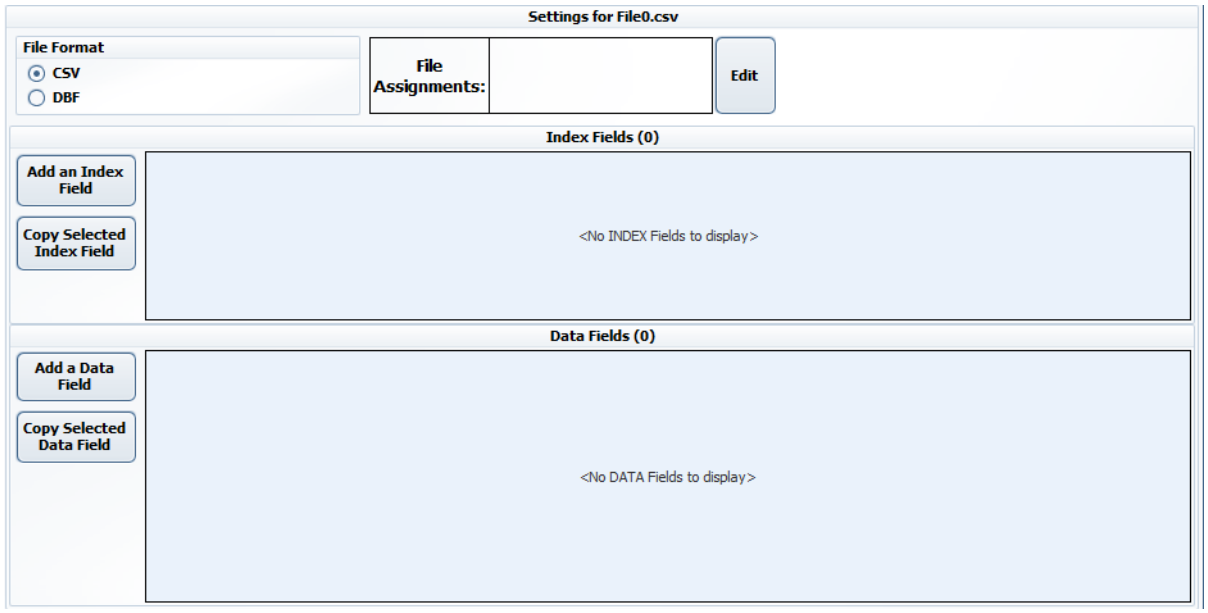
Step 2: Add Files

You can either add the names of all files related to this layout now or you can add them one at a time adding the details for each individual file as you go. To prompt for a file name during import, add a file with the name "*" (without quotation marks.)



Note: If no files are specified for a particular mode, then that mode will not be listed as part of the layout on the main form.

Step 3: Edit File Details



File Format

Here you will specify the format the file is in. While generally this should match the extension of the file, it doesn't have to. Currently supported formats are:

- **CSV** (Comma Separated Values) - This is the most common format for data input since it can be created by most Travel Demand programs or from Excel spreadsheets.
- **DBF** (dBASE Filename Extension) - An older file format, but still a common format for database output.

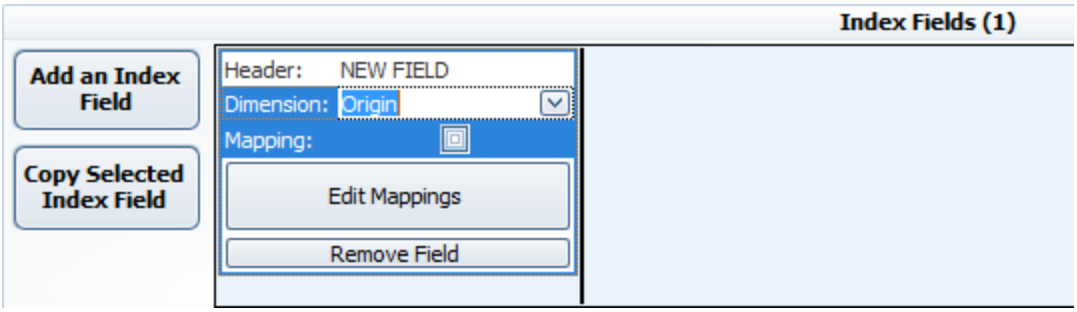
Please note that currently all CSV files are required to have a header row which is used to identify the columns of data. The columns headers must also have unique names.

File Assignments

Click the Edit button next to the File Assignments to adjust what dimensions of the data are assigned to the file. This will be covered in more detail in the next step.

Index Fields

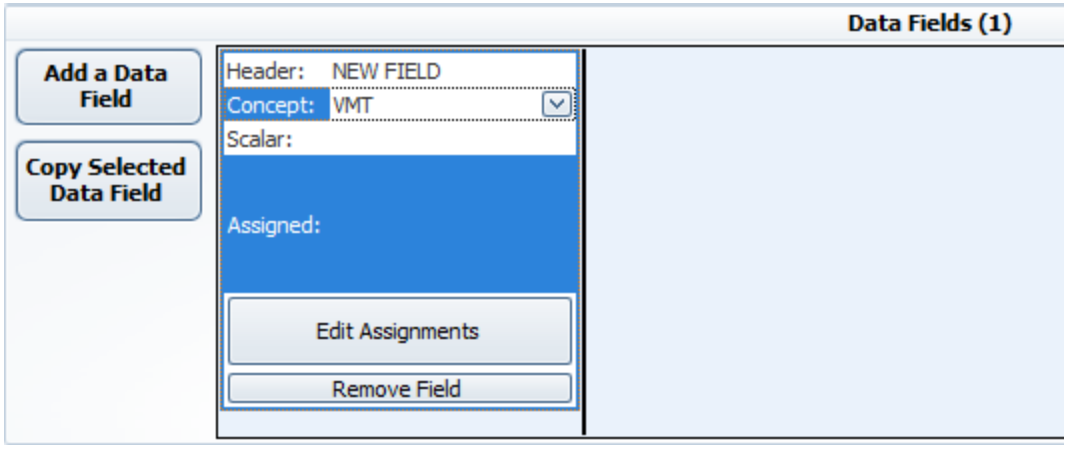
You can use the **Add an Index Field** button to add a new Index Field to the File layout. To remove an Index field, simply click the **Remove Field** button at the bottom of the Index Field details. A common example of an Index Field would be a field/column that specifies the origin or destination region.



- **Header** - The header is the name that the layout will look for in the header row of the csv file (or the field name in a dbf file). This name must be unique within the file itself.
- **Dimension** - An Index field can only have one dimension assigned to it, the one it is an index into.
- **Mapping** - The checkbox simply indicates whether or not a mapping has been assigned to this Index. Use the Edit Mappings button below this to make changes.
- **Edit Mappings** - This button is used to show the Mapping Editor for the selected Index. Mappings are used when an index has text values rather than numeric ones or when you need to aggregate data. Mappings will be explained further in Step 5.
- **Remove Field** - This button is used to remove the field from the file layout.

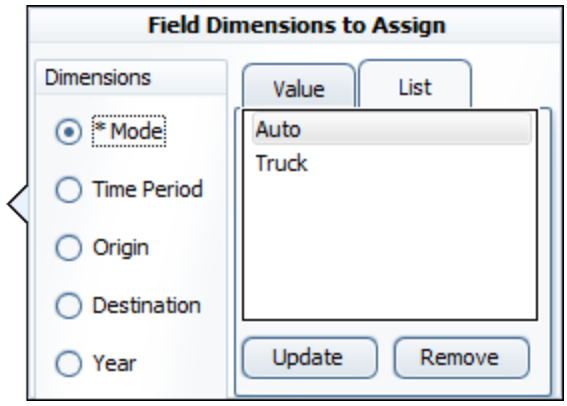
Data Fields

You can use the **Add a Data Field** button to add a new Data Field to the File layout. To remove a field, simply click the **Remove Field** button at the bottom of the Data Field details.



- **Header** - The header is the name that the layout will look for in the header row of the csv file (or the field name in a dbf file). This name must be unique within the file itself, but it doesn't need to be unique in the layout. For example if you had one set of data that you wanted to split between two Road Modes you could specify that field twice, assign it different dimension and apply a different scalar value to each.
- **Concept** - This specifies which of the 3 primary concepts (VMT, VHT, Trips) is associated with this Data Field.
- **Scalar** - This specifies a scalar which all values in the field will be multiplied by during import. This can be used for several purposes, for example if your VHT is in minutes you could scale it to hours here. Or if your VMT is in millions of miles you would scale it down to miles using this property.
- **Assigned** - This lists the various dimensions which are associated with your field. Use the Edit Assignments button below this to make changes.
- **Edit Assignments** - This button is used to show the Assignment Editor for the selected Index. You can find out more about assigning dimensions to fields in Step 4.
- **Remove Field** - This button is used to remove the field from the file layout.

Step 4: Assigning Dimensions



For every File and Data field you will need to assign the dimensions associated with it. For example, if this field contained Auto VMT during the AM time period, you would want to make sure the *Mode: Auto* and *Time Period: AM* were associated with this field. Any dimensions that are common to all fields in a file should be associated as File Dimensions or any dimension for which only a single element exists (for example if your configuration only has a single Time Period) should also be assigned to the file dimension assignments for all files.

Dimensions

This is where you select which Dimension Assignment you wish to adjust. Any Dimensions which already have an element assigned to them are marked with an *. If this is for an Index Field you will only have the dimension list and changing the selected dimension will automatically change it for the field.

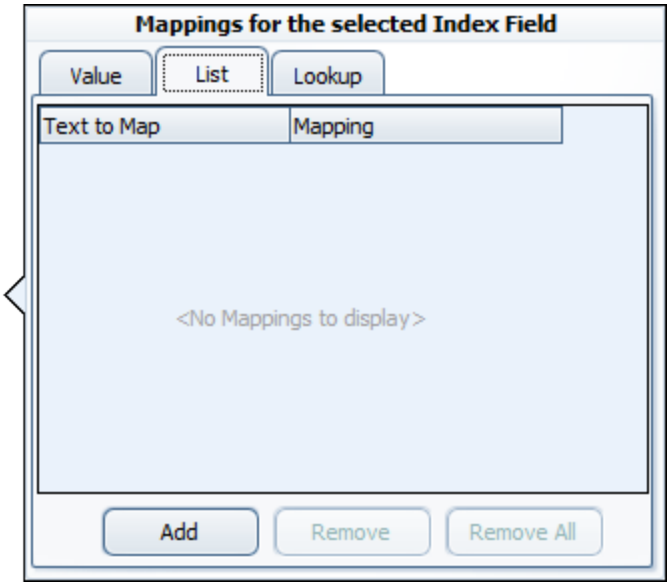
Value

The Value tab is used to assign the element index directly. This is what is actually used by TranSight when it imports the files. You will most likely only be using this when a list of the dimension labels is not available. The values are 1-relative.

List

The list shows all the elements available for the currently selected Dimension. To assign an element to the currently selected Field or File simply select it from the list and click the **Add** or **Update** button. You can use the **Remove** button to remove a dimension element from the assignment for the currently selected Field or File.

Step 5: Mappings



For every Index field you can assign a mapping, but in most cases you will not need to. If the index field in your file contains numeric values that properly match up with the Dimension elements they are to be associated with, then this is not necessary. For example if you have a field that is an Index for the Origin dimension and the field contains values (starting at 1) that correlate to the regions in your model, then no mapping is necessary. If, however, they do not match (for example they are FIPS codes or some other region identification number), you will need to use a mapping. Most commonly mappings are used when the index field contains a textual description, such as the region name. In this case you will need to create a mapping for each unique value within that field.

Mappings can also be used to aggregate values. For example, if your output files contain more regions than the TranSight model, you could use a Mapping to combine regions into the proper regions in the TranSight model.

Text to Map

This is where you would specify the text that will be replaced.

List

The lets you specify the mapping as it relates to the dimension labels. Generally this is the easiest way to associate them, although in some cases it will look like you are mapping the text to the same value. This is simply because the list view handles the translation of the labels to actual values.

Value

The Value tab is used to assign the element index that the text will be mapped to directly. This is what is actually used by TranSight when it imports the files. You will most likely only be using this when a list of the dimension labels is not available. The values are 1-relative.

Lookup

The Lookup tab is used to assign pre-defined mapping based on the existing labels for Mode, Time Period, Regions, or Years. This is most commonly used for Years as manually adding in mappings for years can be tedious and may cause them to be out of sync between versions with different Last History Years. Regions is another common Lookup mapping to assign when you know your files will consist of region names rather than numbers. However, be certain that the region names are an exact match with what the TranSight model uses.

Note: If you have an Index for the Year dimension, you will still need to set up a Mapping if the values in that field are the actual years (ex. 2014, 2015, etc.). This is necessary because while those are numeric values, the import is expecting a year index starting with 1 for the first year. The Lookup Mapping is recommended to handle this.

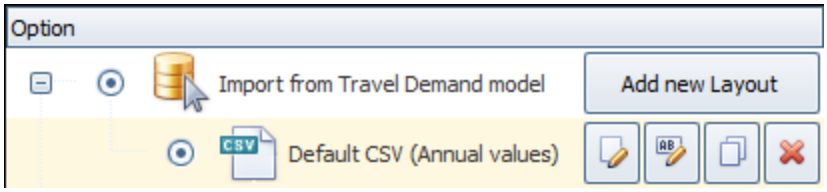
Note: If you have specified a **Set Year** for the First Data Year you will have an additional button labeled **Fill Mappings Based on First Data** year when defining the mappings for a Year **Index**

Field. If you are providing travel demand data for years prior to the model's first forecast year, you can use this button to automatically generate the appropriate mappings for you.

Step 6: Final Steps

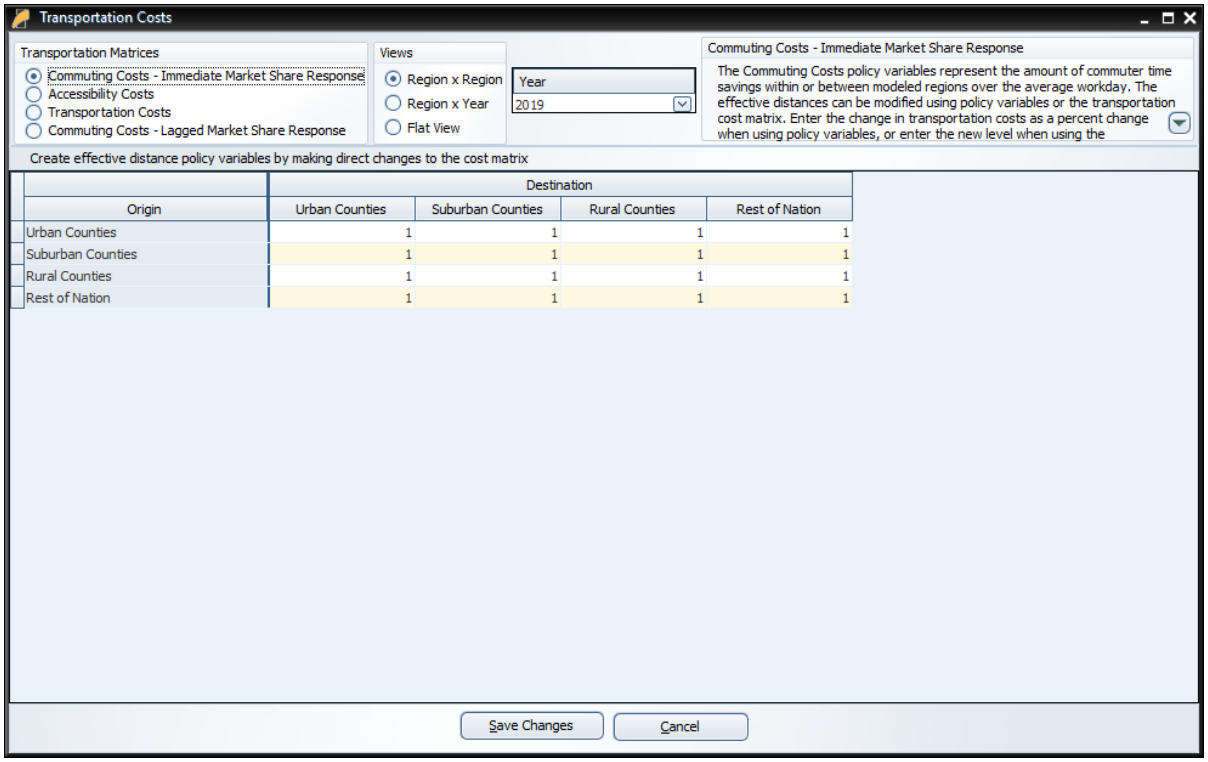
Once you have specified all the files and their respective fields in the layout, click the **Save** button to save these changes to your configuration.

After you have saved your new Source Layout, you will be able to edit, rename, duplicate, or delete it with the 4 buttons next to its name in the Travel Demand Manager.



Cost Matrices

You can also view/edit the changes to the Transportation cost matrices by clicking on **Highway** in the forecast navigation screen and then **Effective Distance**. Next, choose to edit the values **As Cost Matrix**. This will take you to the Transportation Costs Editor.



There are three cost matrices you can view/edit by choosing the appropriate radio button below **Transportation Matrices**:

- **Commuter Costs** - describes the amount of commuter time savings within or between modeled regions over the average workday.
- **Accessibility Costs** - describes access to more diverse consumer goods and services by households, as well as access to a broader array of intermediate inputs by employers.
- **Transportation Costs** - describes the amount of cost savings in transporting goods and services due to an increase in transportation efficiency.

These matrices are used to calculate the amount of cost savings induced by improvements in the transportation network. The numbers in the table represent the percentage of savings across the transportation system for specific pairs of regions (including within each region) relative to the baseline:

- 1 = no change from the baseline
- Below 1 = cost savings relative to the baseline
- Above 1 = cost increases relative to the baseline (e.g., during a construction period)

For example, 0.99 represents a 1% cost savings across the transportation system for that region or pair of regions.

You can also change the view to better allow you to see or edit the changes made.

Once you are done making any changes to the matrices, you can click the **Save Changes** button. If you do not wish to save any changes you have made or were simply viewing the results of the Travel Demand Study, click the **Cancel** button instead.

Additional Highway Inputs

After you have run the Travel Demand study, you may wish to add additional policy variables to further detail the changes created by the project. Back on the screen under the **Highway** button of the forecast navigation screen, there are four additional categories of data inputs:

- **Design and Construction** - A change in road or transit construction activity can enter the model as Demand or Sales/Employment.
- **Operation and Maintenance** - A change in construction activity reflecting road or transit operation and maintenance spending can enter the model either as Demand or Sales/Employment.
- **Government Funding** - Funding options for transportation-related projects typically involve a combination of several sources, including federal, state, and local governments, as well as specific consumer and business taxes/fees.

Model Assumptions

In addition to directly entering policy variables, a forecast can also be changed from its baseline by another type of input: customized model assumptions. Model assumptions can only be added to control forecasts. There are five categories of model assumptions, some of which are applicable only to regional controls and some only to national controls. All five categories of model assumptions are handled by the Forecast Updates window shown in **Figure 42**. This window shows all of the available assumption types that can be modified for the current forecast. Each assumption type has at least one default assumption, called either the Baseline or REMI Standard assumption. Some types of assumptions have other pre-defined choices available. **Figure 42** shows two such alternative Macroeconomic Update assumptions, representing higher and lower GDP growth scenarios compared to the baseline forecast. The tools menu along the top of the window has buttons for opening each assumption to view its data, copying an assumption for customization, and creating a brand-new assumption to start from scratch. You can also rename and delete assumptions and import assumption files from past versions. To select a non-baseline assumption, whether it is a REMI alternative or custom-made, just click the checkmark button on the assumption's card. Some types of assumptions will feature a visualization consisting of a chart and table that depict how the selected assumption affects the relevant concept.

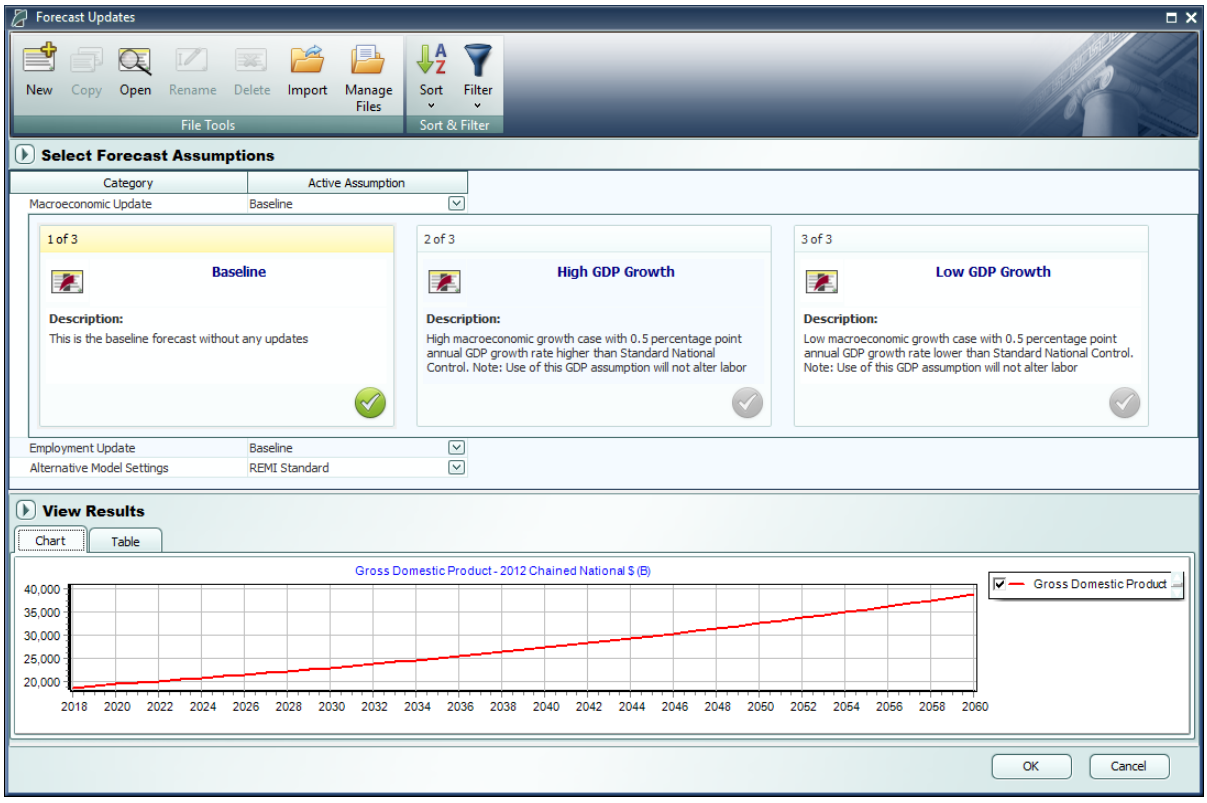


Figure 42: Forecast Updates Manager

Employment Update

Employment updates are accessible for national and regional control forecasts and allow for calibration of a forecast to alternative by-industry employment data.

Creating an employment update is a multi-step process. You will first be presented with an **Overview** to guide you on how an Employment Update works and how to use it. Moving on to **Options** you can enter employment values at different industry and region aggregation levels and in different units. If you make changes to the options after entering values you may lose some of the changes you made.

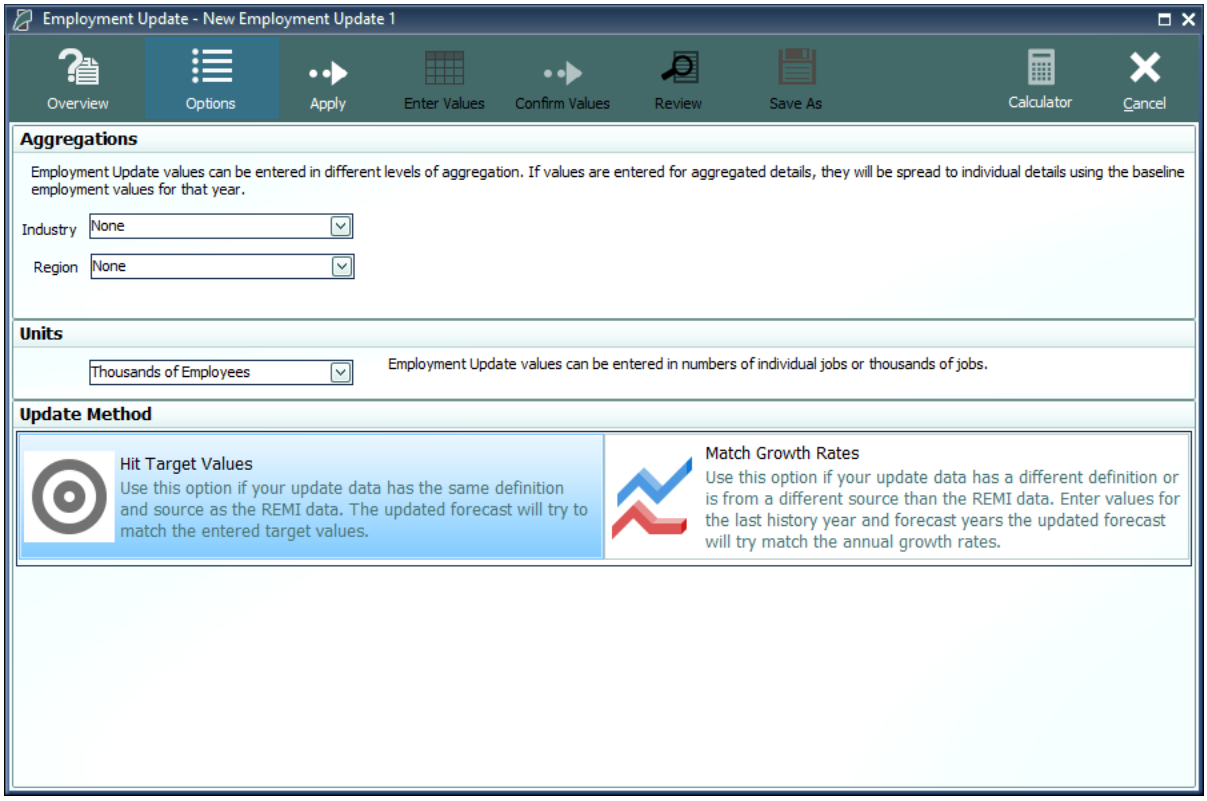
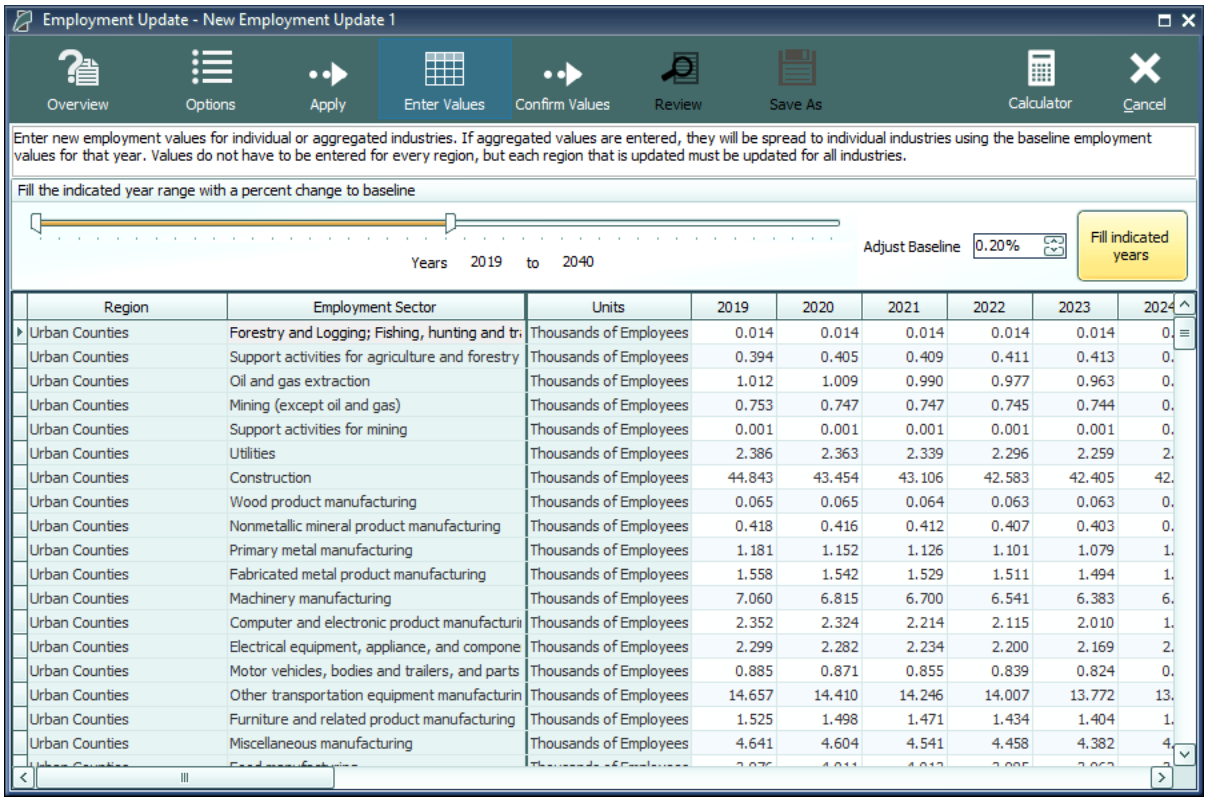


Figure 43: Employment Update - Options

Once you have made any necessary changes to the options click **Apply** to begin entering the updated values. Data must be entered for every industry, but not every region. To fill in new employment values based on the default employment values, use the tools at the top of the window.



Region	Employment Sector	Units	2019	2020	2021	2022	2023	2024
Urban Counties	Forestry and Logging; Fishing, hunting and tr	Thousands of Employees	0.014	0.014	0.014	0.014	0.014	0.
Urban Counties	Support activities for agriculture and forestry	Thousands of Employees	0.394	0.405	0.409	0.411	0.413	0.
Urban Counties	Oil and gas extraction	Thousands of Employees	1.012	1.009	0.990	0.977	0.963	0.
Urban Counties	Mining (except oil and gas)	Thousands of Employees	0.753	0.747	0.747	0.745	0.744	0.
Urban Counties	Support activities for mining	Thousands of Employees	0.001	0.001	0.001	0.001	0.001	0.
Urban Counties	Utilities	Thousands of Employees	2.386	2.363	2.339	2.296	2.259	2.
Urban Counties	Construction	Thousands of Employees	44.843	43.454	43.106	42.583	42.405	42.
Urban Counties	Wood product manufacturing	Thousands of Employees	0.065	0.065	0.064	0.063	0.063	0.
Urban Counties	Nonmetallic mineral product manufacturing	Thousands of Employees	0.418	0.416	0.412	0.407	0.403	0.
Urban Counties	Primary metal manufacturing	Thousands of Employees	1.181	1.152	1.126	1.101	1.079	1.
Urban Counties	Fabricated metal product manufacturing	Thousands of Employees	1.558	1.542	1.529	1.511	1.494	1.
Urban Counties	Machinery manufacturing	Thousands of Employees	7.060	6.815	6.700	6.541	6.383	6.
Urban Counties	Computer and electronic product manufacturi	Thousands of Employees	2.352	2.324	2.214	2.115	2.010	1.
Urban Counties	Electrical equipment, appliance, and compone	Thousands of Employees	2.299	2.282	2.234	2.200	2.169	2.
Urban Counties	Motor vehicles, bodies and trailers, and parts	Thousands of Employees	0.885	0.871	0.855	0.839	0.824	0.
Urban Counties	Other transportation equipment manufacturin	Thousands of Employees	14.657	14.410	14.246	14.007	13.772	13.
Urban Counties	Furniture and related product manufacturing	Thousands of Employees	1.525	1.498	1.471	1.434	1.404	1.
Urban Counties	Miscellaneous manufacturing	Thousands of Employees	4.641	4.604	4.541	4.458	4.382	4.

Figure 44: Employment Update - Enter Values

Once you are done entering new employment values, click the **Confirm Values** button. This will bring you to the **Review** section. From here you can review the changes broken out to the most detailed levels and compare it against the baseline employment. You can also enter a description of your customized employment update in the text field at the bottom of the window.

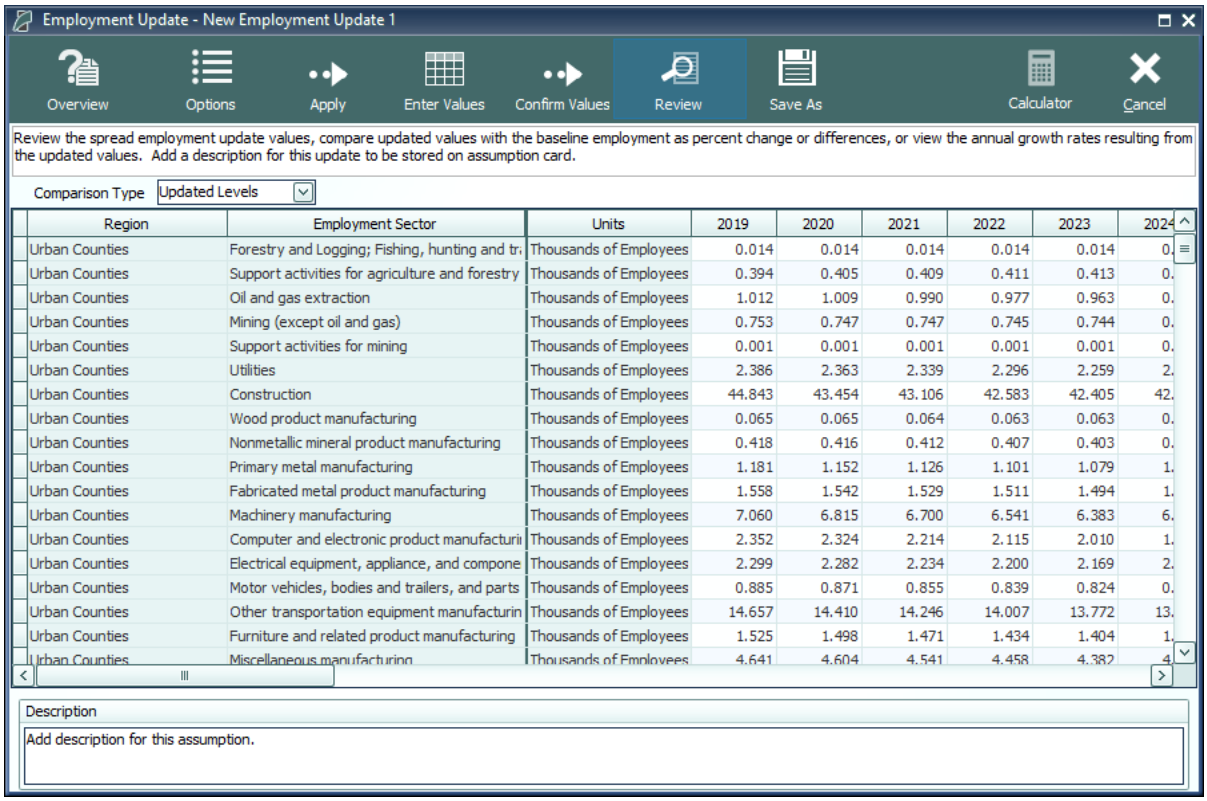


Figure 45: Employment Update - Review

When you are done reviewing click the **Save As** button to save your new Employment update.

Population Update

Population updates are available only for regional controls. This type of assumption can be used to adjust regional population levels. The overall process is the same as an employment update but with different options. Alternate population values can be entered by race and by gender, or for all races and both genders together. Different age aggregations, unit types, and region aggregations are also available.

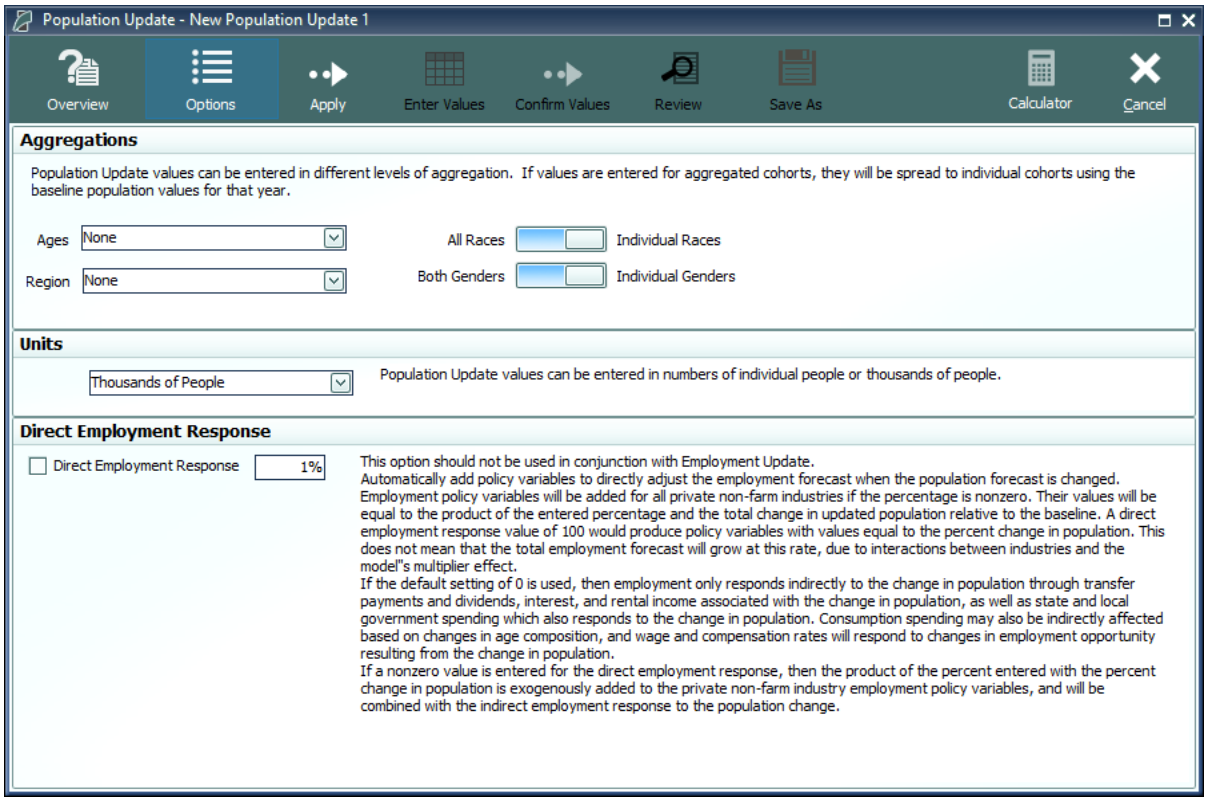


Figure 46: Population Update - Options

Macroeconomic Update

The Macroeconomic Values Update allows you to calibrate a national forecast to alternative macroeconomic data by component. The overall process is the same as an employment update but with different options. You can enter values based on final demand, personal income, or a combination of final demand and personal income. Changing the level of the GDP type in the combobox allows you to specify the level of final demand detail you wish to enter. You can also toggle on several optional inputs to enter a different inflation assumption, change the national unemployment rate assumption, or change the labor productivity growth rate. The labor productivity growth rate can be entered for each sector or as the average growth rate of all sectors.

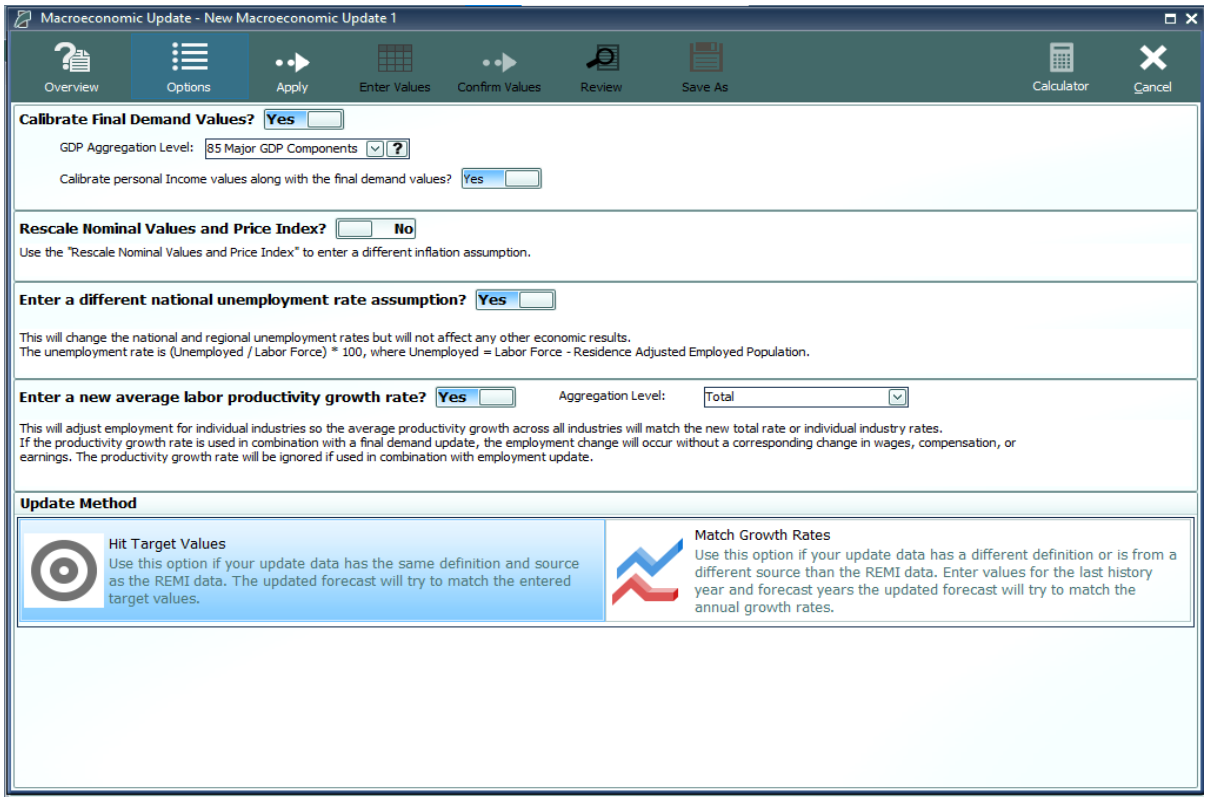


Figure 47: Macroeconomic Update - Options

National Demographic Assumptions

National Demographic assumptions allow for modifying various demographic aspects of a national forecast. Alternate values can be entered for birth rates, survival rates, international migration, and participation rates. These custom national demographic values must be entered by gender, race, and individual age group. A description of a national demographic assumption can be added using the text field on the top left of the form.

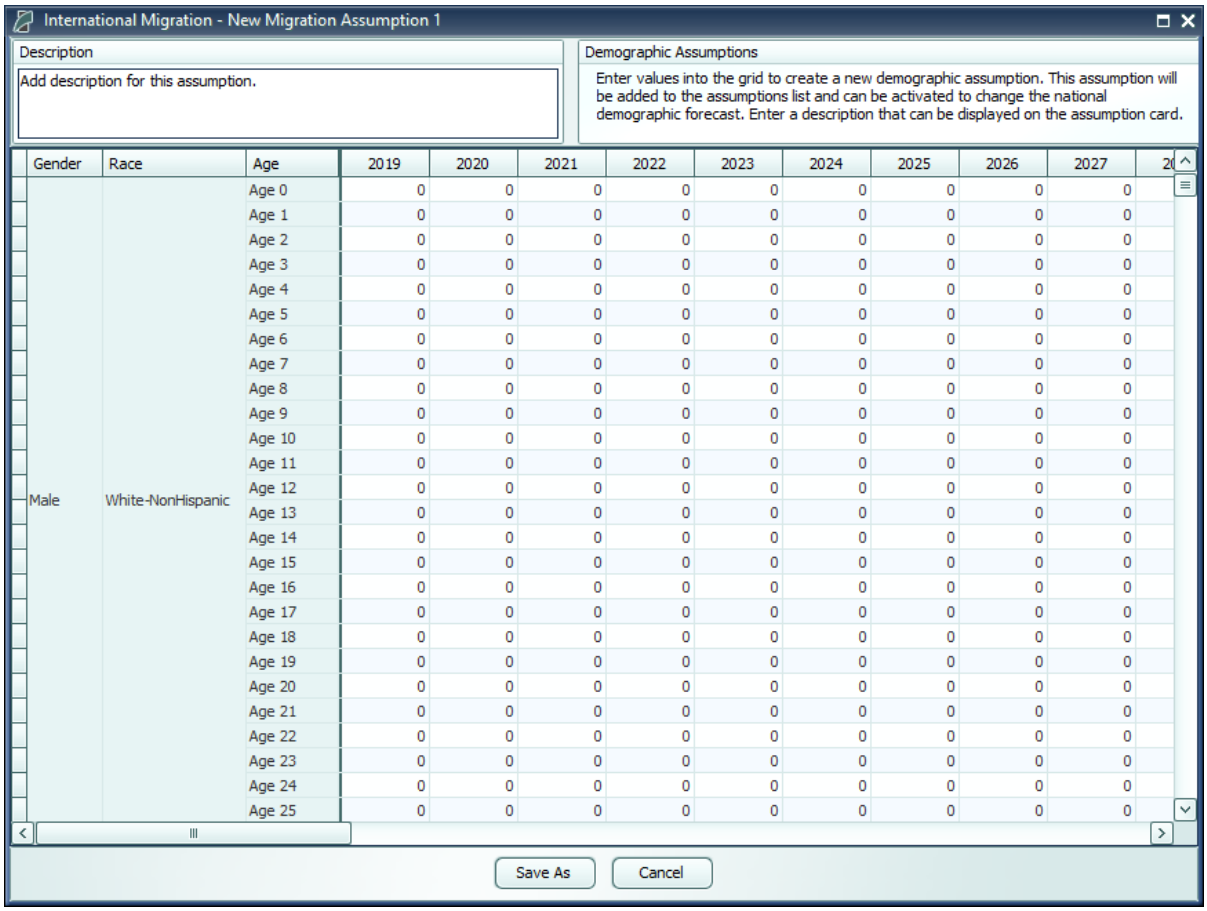


Figure 48: National Demographic Assumption

Alternative Model Settings

Different pieces of the REMI model's structure are linked together in certain ways as our best means of approximating of how the real economy generally works. In some cases, you may find that the model would better match a particular real-world scenario if some of these connections behaved differently or were removed altogether. Using the Alternative Model Settings, you can do just that by changing certain settings that control various interacting parts of the model. Depending if you are creating a national or regional control, there are different settings that are available. Certain pre-defined alternative sets of settings exist that REMI has found to be useful in the past. When making your own custom alternate model settings, simply toggle any of the on-off switches to enable or disable that particular model response. A few settings are actually parameters to model equations that can be modified. Each of these has an alternative set of values that can be viewed and selected for substitution. The default housing price and land price coefficients can also be substituted for custom values. Any setting that has been changed from the REMI default value will be highlighted for easy differentiation. Information buttons containing setting descriptions are presented next to every setting.

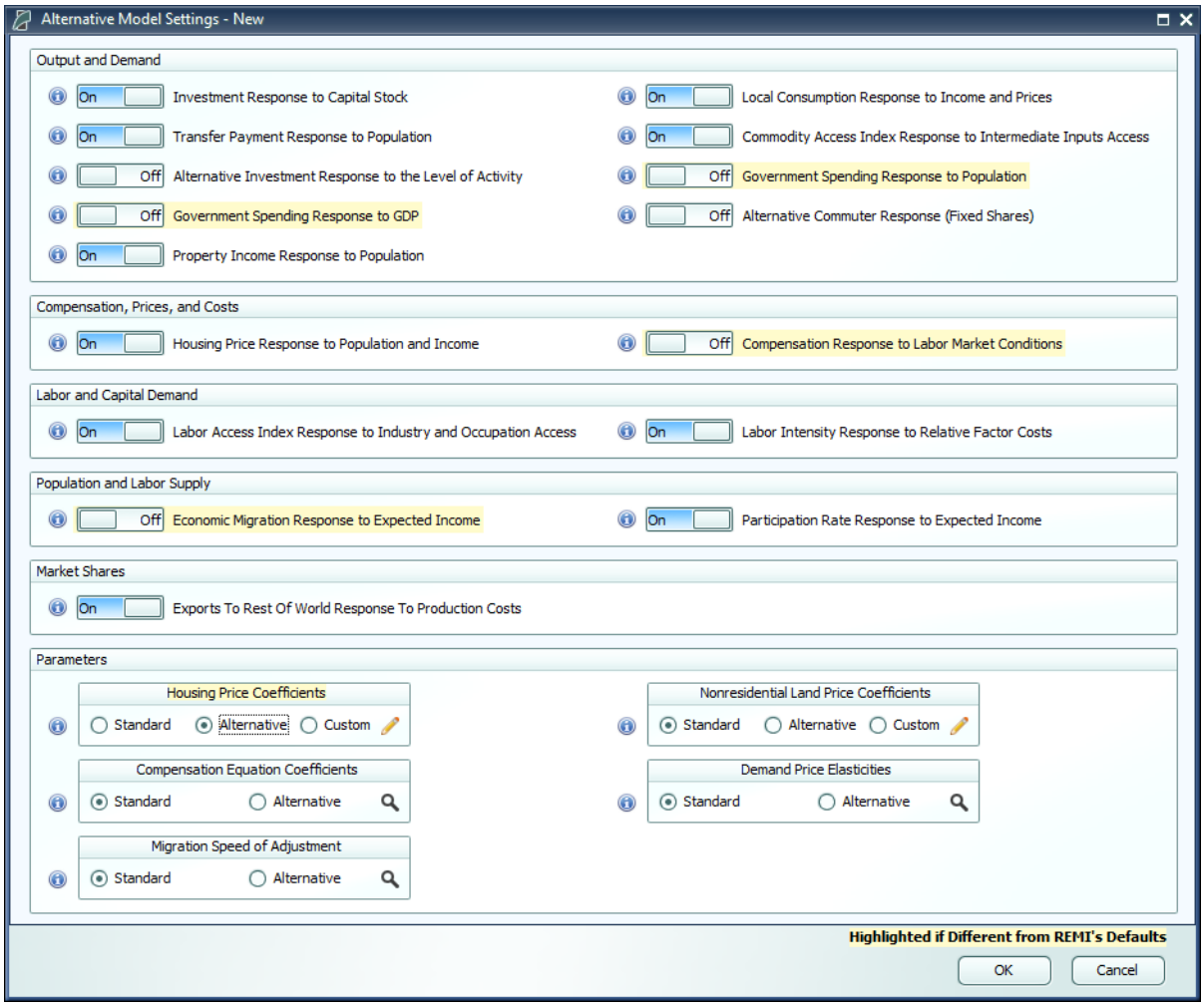


Figure 49: Alternative Model Settings

Inputs List

The Inputs List is a screen that displays the policy variable groups and contained policy variables that will be included as inputs to the model as it runs. Expand any group to see the variables inside. Unchecking a check box in the **Active** column of the list will exclude the corresponding variable or variable group from the forecast run. Another feature of the Inputs List is the ability to inspect the converted versions of a given policy variable. While there are many different ways to specify any particular policy variable, only one format can actually be used by the model, so conversion is necessary. Clicking on the magnifying glass icon on a policy variable in the Inputs List will open this converted variable window. The **Tools** button stationed on the header of the Inputs List provides some useful functionality for selecting, merging, and deleting groups of policy variables from the list. Finally, any model assumptions that have been added to the forecast will also be displayed on this screen alongside a button for quickly editing them.

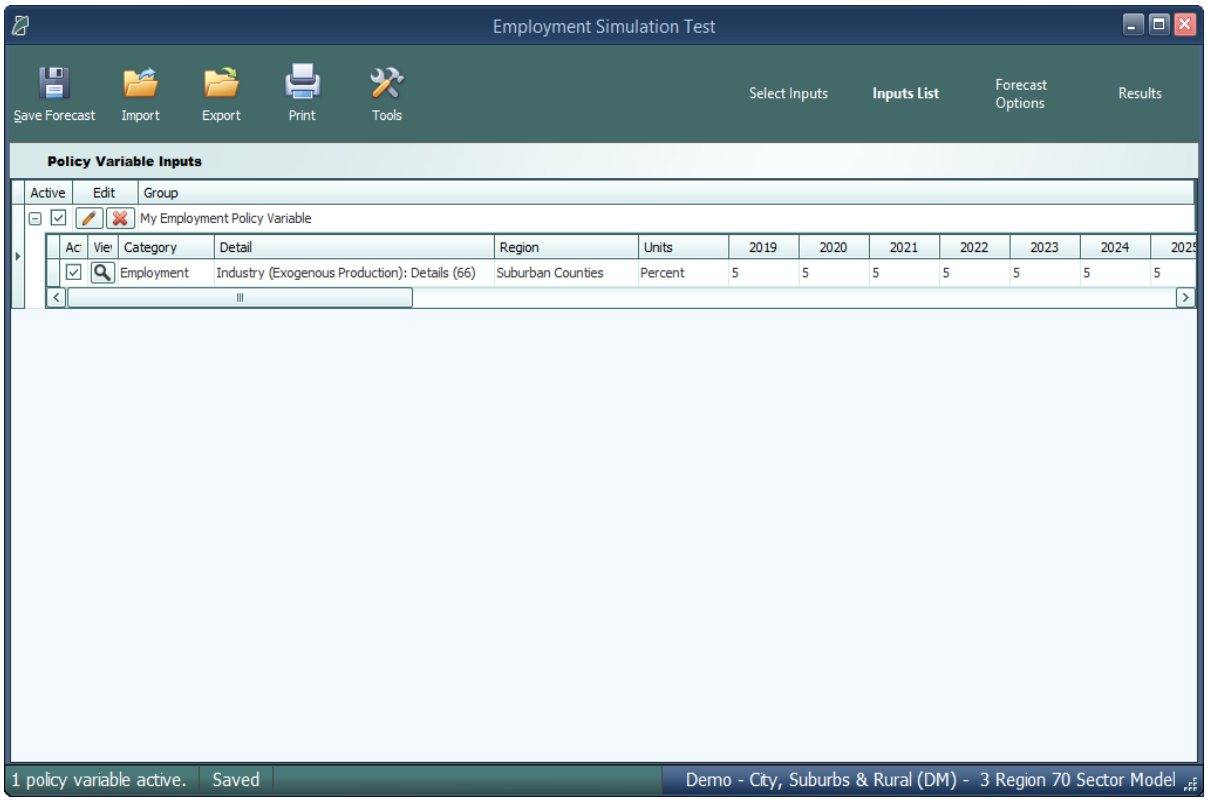


Figure 50: Inputs List

The policy variable import and export buttons are also located on the inputs list. Clicking the **Export** button will open the Export Center, which provides functionality for selecting which of the existing policy variables should be exported. Likewise, clicking the **Import** button launches a file selection dialog, which, once completed, opens the Import Center. The Import Center offers similar selection functionality to the Export Center, but also has additional options for merging, duplicating, and clearing values from variables found in the export file.

Policy Variable Export and Import Centers

The Export and Import Centers are similar windows that provide a method for deciding which user inputs contained in the present forecast should be exported to a file or imported from a file, respectively. Simply check or uncheck checkboxes in the **Include** column to include or exclude variables.

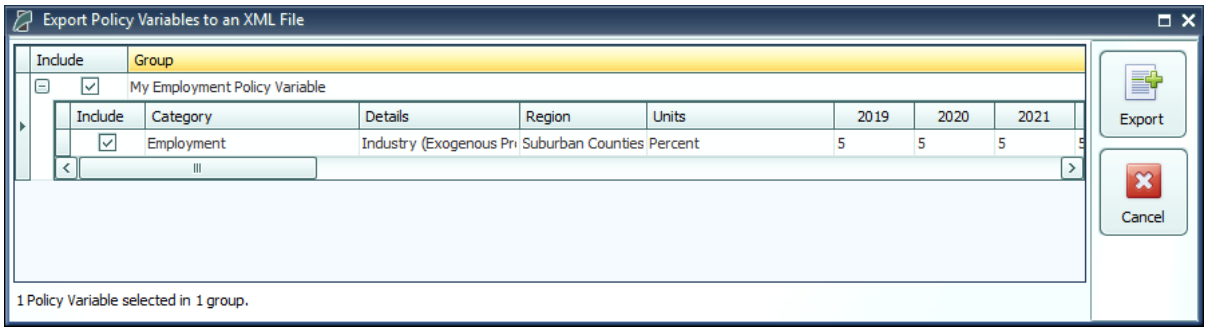


Figure 51: Export Center

Our current policy variable export files use the flexible XML format to store the wide variety of options that can be associated with all of our different types of policy variables. Unfortunately, XML files are not easily manipulated by hand or by third-party software. As such, when working with large numbers of variables for repeated forecast runs, we recommend creating one or more templates using the PV Selector and the policy variable group merging tool and exporting them. A template would then be a large policy variable group containing all of your required variables in the correct order and with the desired options to match the format of your values. Each use of a template then just becomes a task of opening the variable group in the PV Selector and pasting in values, rather than attempting to replicate the complex structure of the policy variables in our export files, which would be highly error-prone.

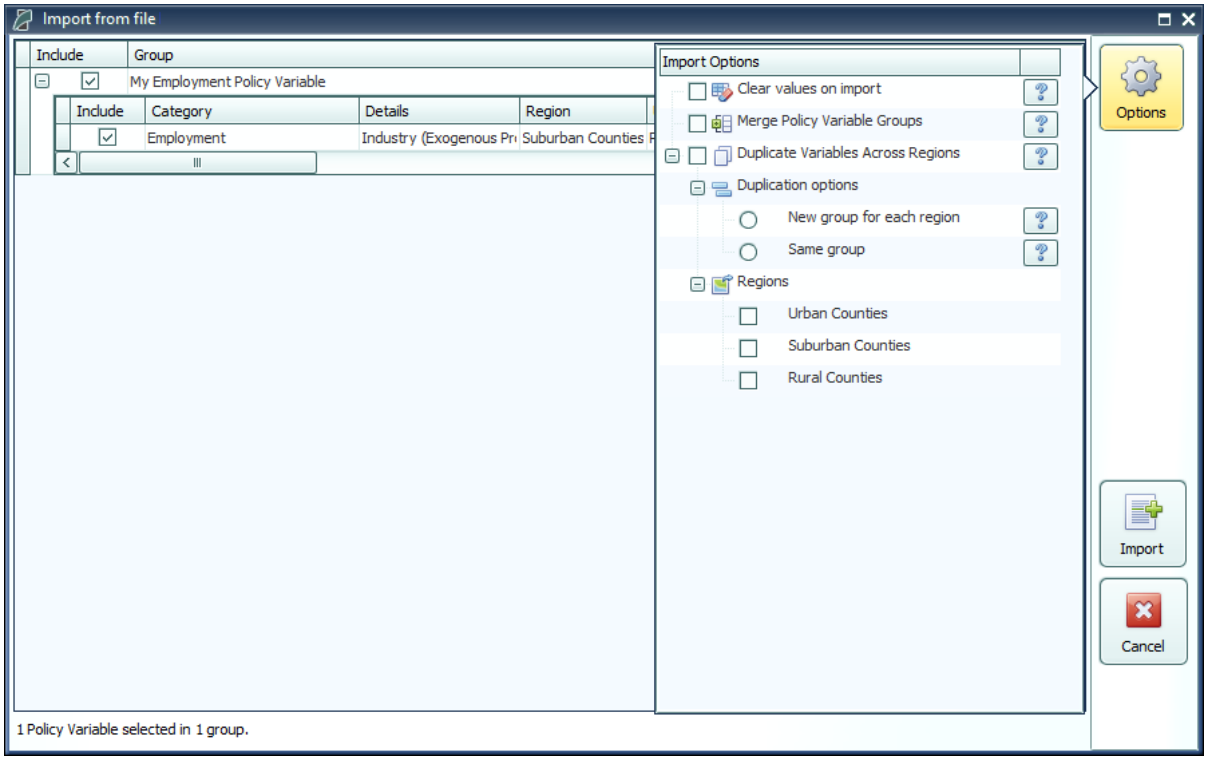


Figure 52: Import Center

Importing with the Import Center follows roughly the same process as exporting, but with more options. There are options for merging policy variable groups, clearing the values out of the variables, and duplicating variables across all or some of your model regions. In addition to the most straightforward form of importing: from an exported XML policy variable file, you can also import policy variables from a REMI workbook file. Use caution when importing from older versions, as your old variables may not perfectly map to new variables.

Forecast Options

Running a forecast takes place on the Forecast Options screen. Once you have finalized your policy variable inputs, you should make some final decisions about how the forecast should run. Depending on the type of forecast, some different options will be available including closure options and iteration settings. Regardless of the forecast, there will be frequently asked questions and answers about the available run options right on this screen. The **Run Years** selector shows what years the forecast will run for. Not all forecast years up to 2060 will be available in all cases. If your forecast has a parent baseline control, only the years for which that control has run will be available. Once you have chosen your options, settings, and run years, simply click the **Run Forecast** button and the model will begin calculating results, as indicated by the pop-up run progress window.

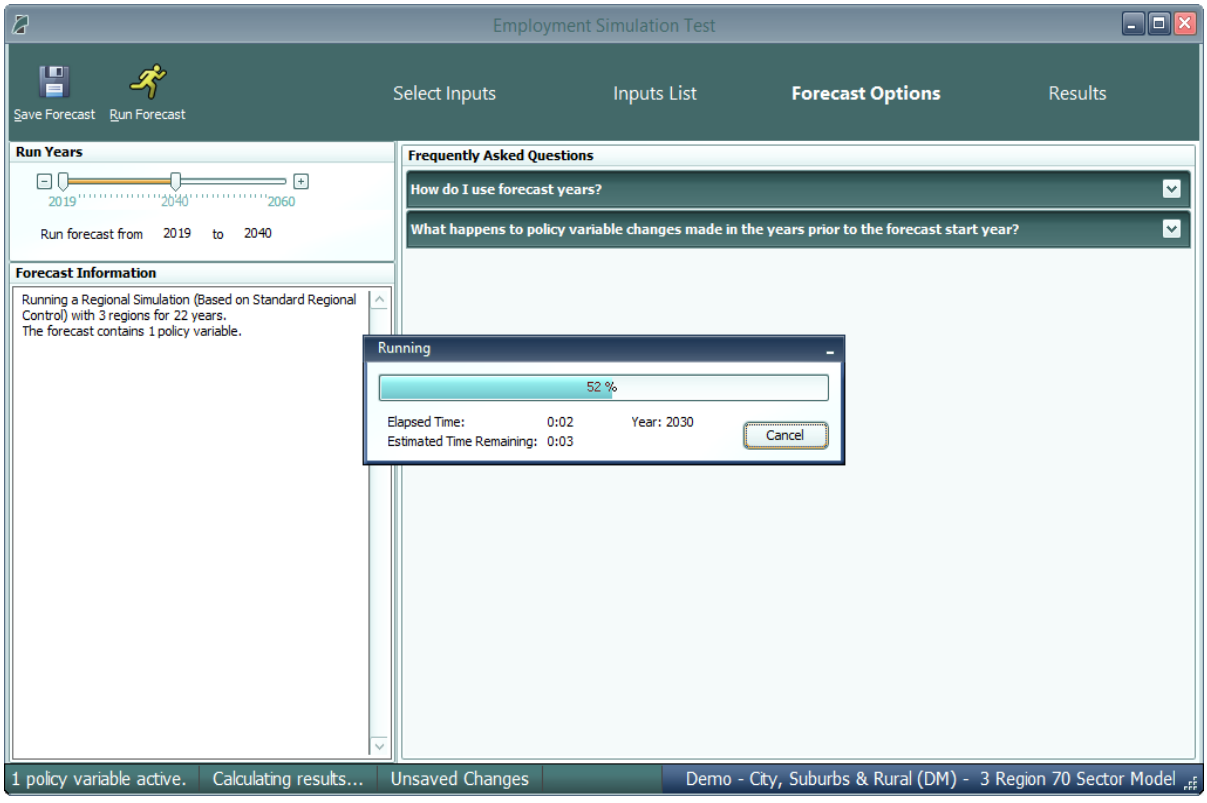


Figure 53: Forecast Options

Results

The Results section of TranSight contains all of the results of the forecast run that were produced by the REMI model. Result data are displayed in tables, maps, and a wide variety of chart-types. The main navigation bar on the left side of the window provides a means for accessing all of the different categories of result visualizations that have been created by REMI. These groupings put results together by concept and help to break up the huge amount of data into more manageable sections.

There are six layouts that are used for arranging visualizations among the different categorized sections of the Results screen. The first is the Key Results layout mode. In this layout, certain key model results are displayed in one of two very simple formats. The first one, which is illustrated in **Figure 54**, presents a single visualization that fills all available space on the screen, with tools displayed on the right-hand side. The second one, which is shown in **Figure 55**, has a set of tabs located above the content area for navigating between multiple visualizations.

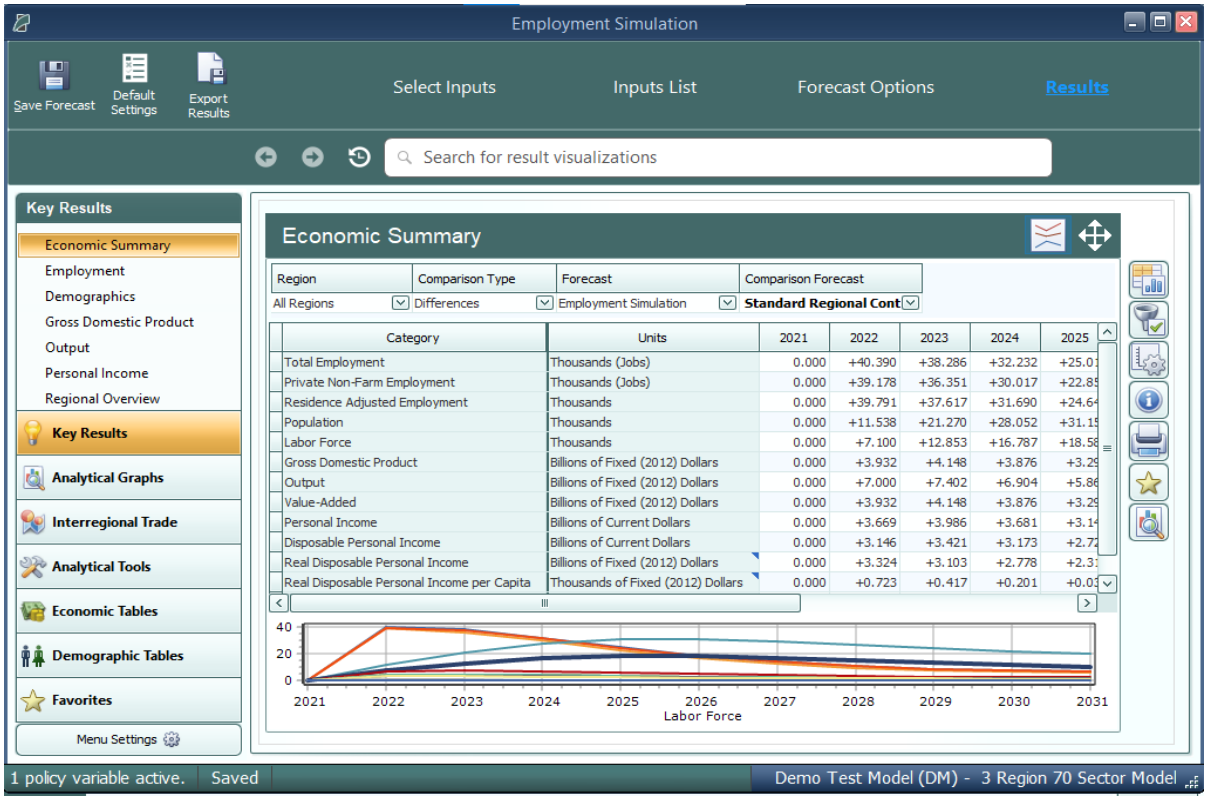


Figure 54: Results – Key Results Mode I

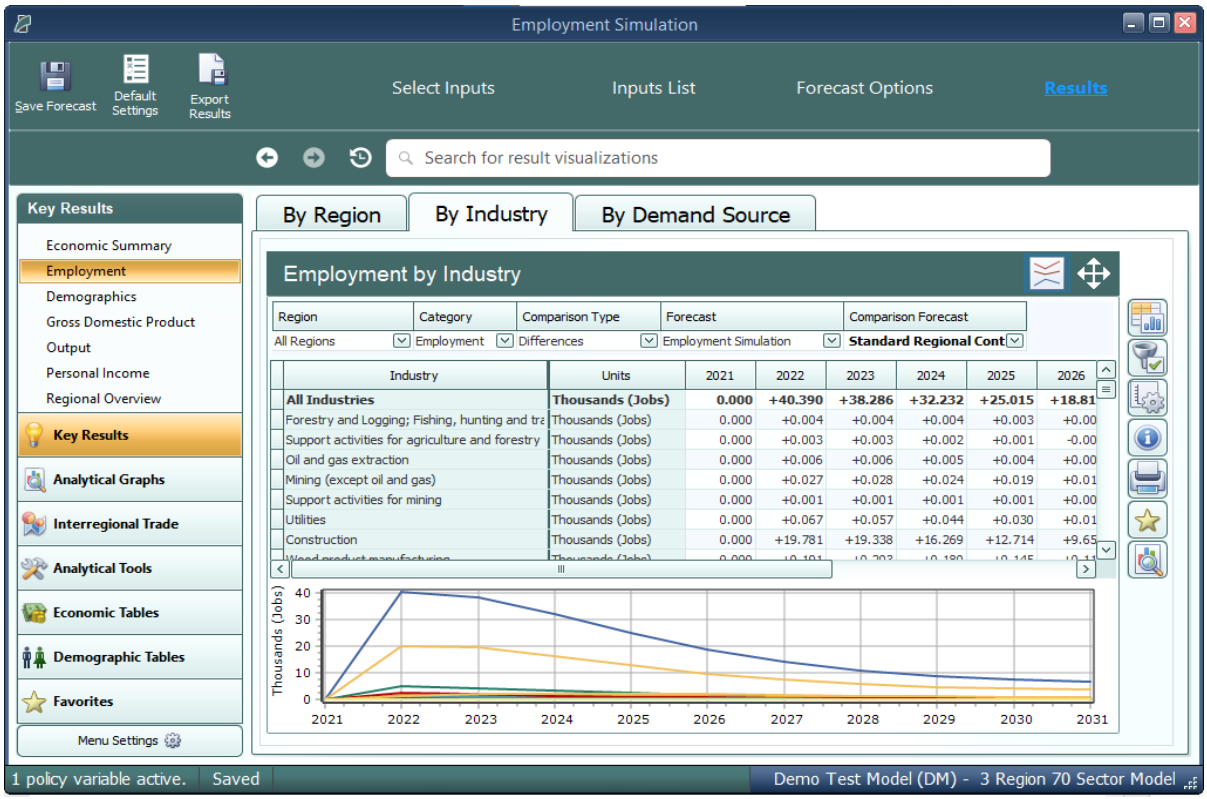


Figure 55: Results – Key Results Mode II

The next four visualization layout types each look quite different, but all function in very similar ways.

The Model Linkages view, shown in **Figure 56**, consists of an interactive diagram that depicts the various links that interconnect different parts of the economy in the REMI model. Any of the outer or inner blocks of the diagram, when clicked, will bring forward a group of related results tables.

Other result categories use tile and list layout modes. These two organizational modes simply contain a list of concepts, hierarchically structured in the case of list mode, where each concept has its own tile or list item that links to the corresponding result table. Examples of these two modes are displayed in **Figure 57** and **Figure 58**.

Model Linkages, tile mode, and list mode share similar functionality once you have selected a concept for viewing of its results. Depicted in **Figure 59**, you can see that the selected result table is shown by itself as part of a tabbed view. The tab bar along the top of the visualization area allows for quickly switching to view any of the other tables included in the same model block, tile group, or list section. The tab bar can be scrolled left and right using the respective on-screen arrow buttons. To go back to the starting view, use the back button on the top left. There is also a row mode which can show multiple rows of visualizations with multiple visualizations on each row.

The fifth layout used on the results screen is row mode that is used on the customizable Favorites section of the results. As shown in **Figure 60**, tables and visualizations appear to the right of their group name and description. To enlarge a visualization for further viewing, click the button with four direction arrows on the top right corner of any visualization. You can shrink the visualization to return to the rest of the rows view by clicking the top right button again.

The sixth and final, which is visible in **Figure 61**, is the gallery mode. In gallery mode, one visualization takes up the majority of the space on the screen and the remaining visualizations belonging to the same group are previewed on a scrolling list of tiles on the right-hand side of the screen. This tile list can be scrolled up and down by dragging with the mouse, using the mouse wheel, or by hovering the mouse near the top-most or bottom-most tile and clicking on the arrow buttons that appear. Clicking on any preview tile will slide that visualization into the central, focused view.

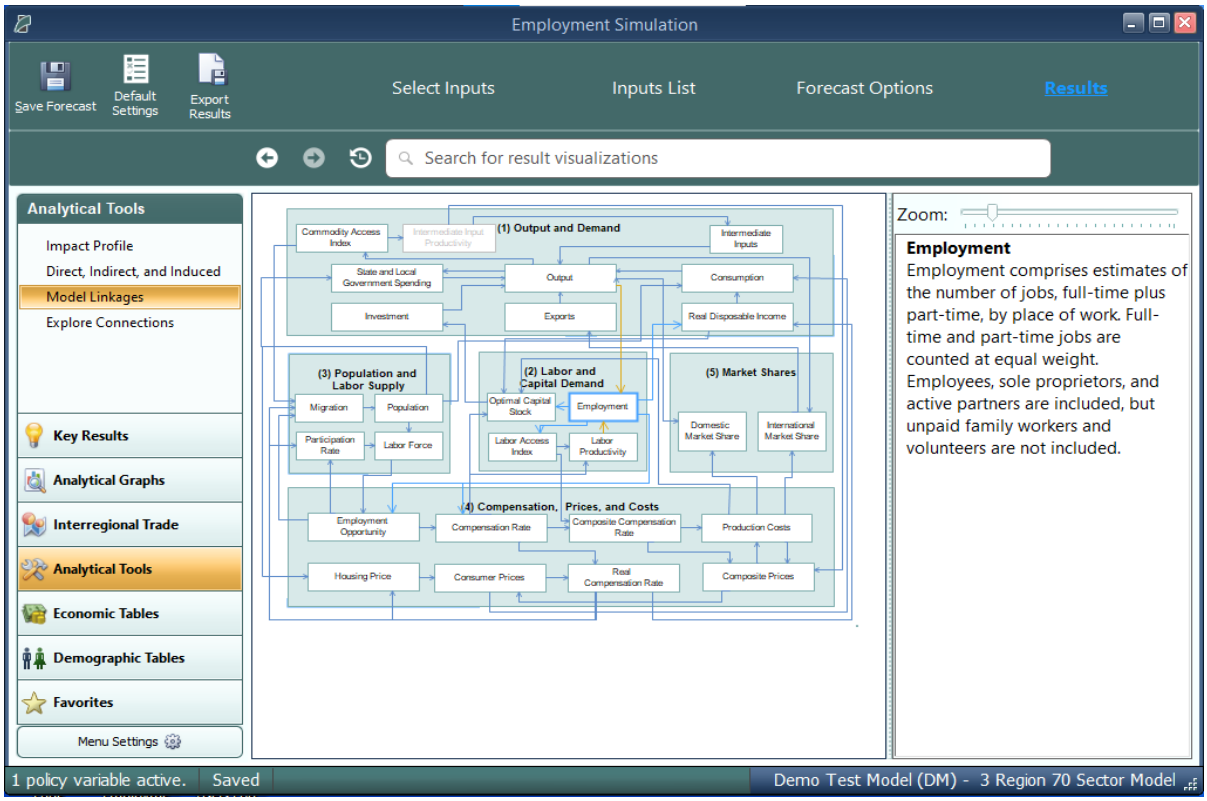


Figure 56: Results – Model Linkages

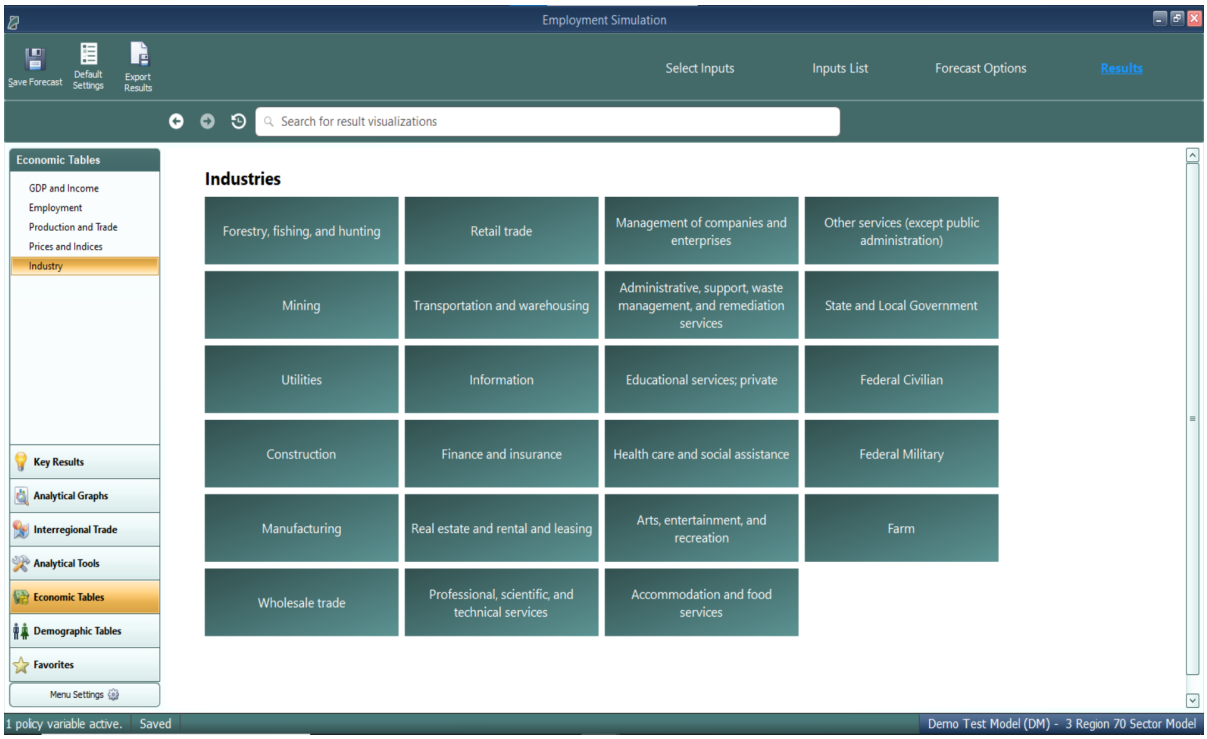


Figure 57: Results – Tile Mode

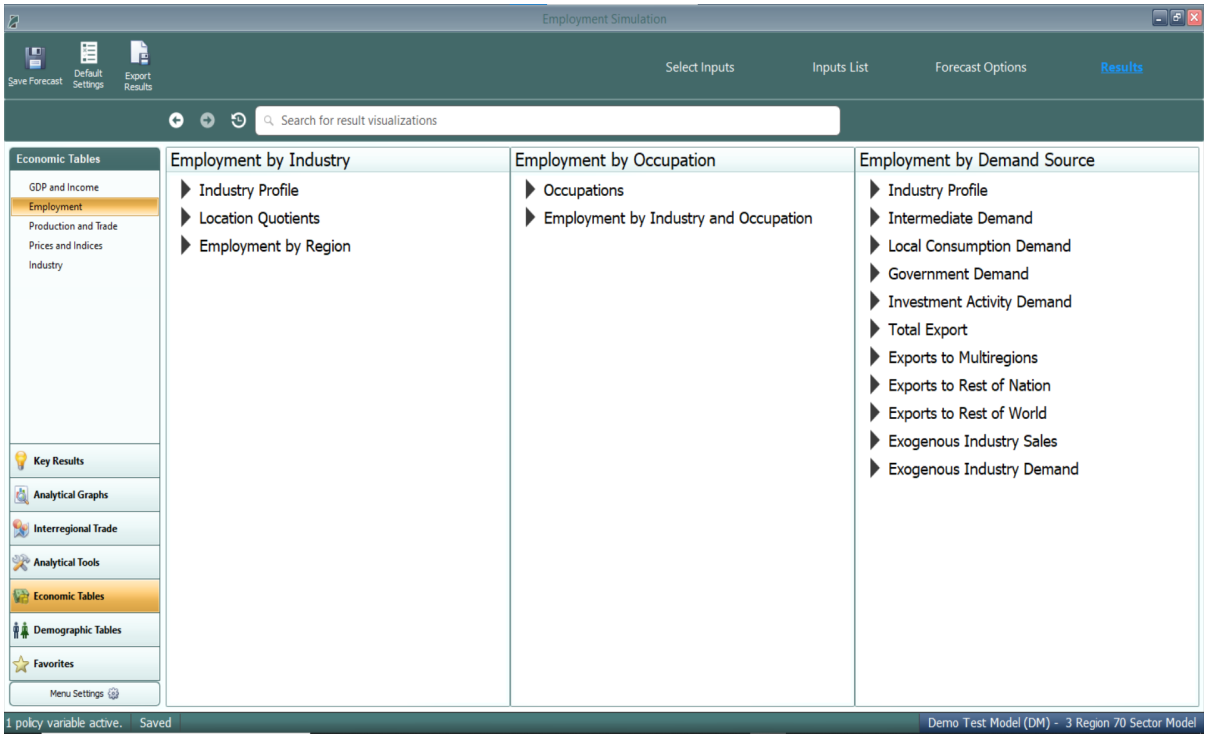


Figure 58: Results – List Mode

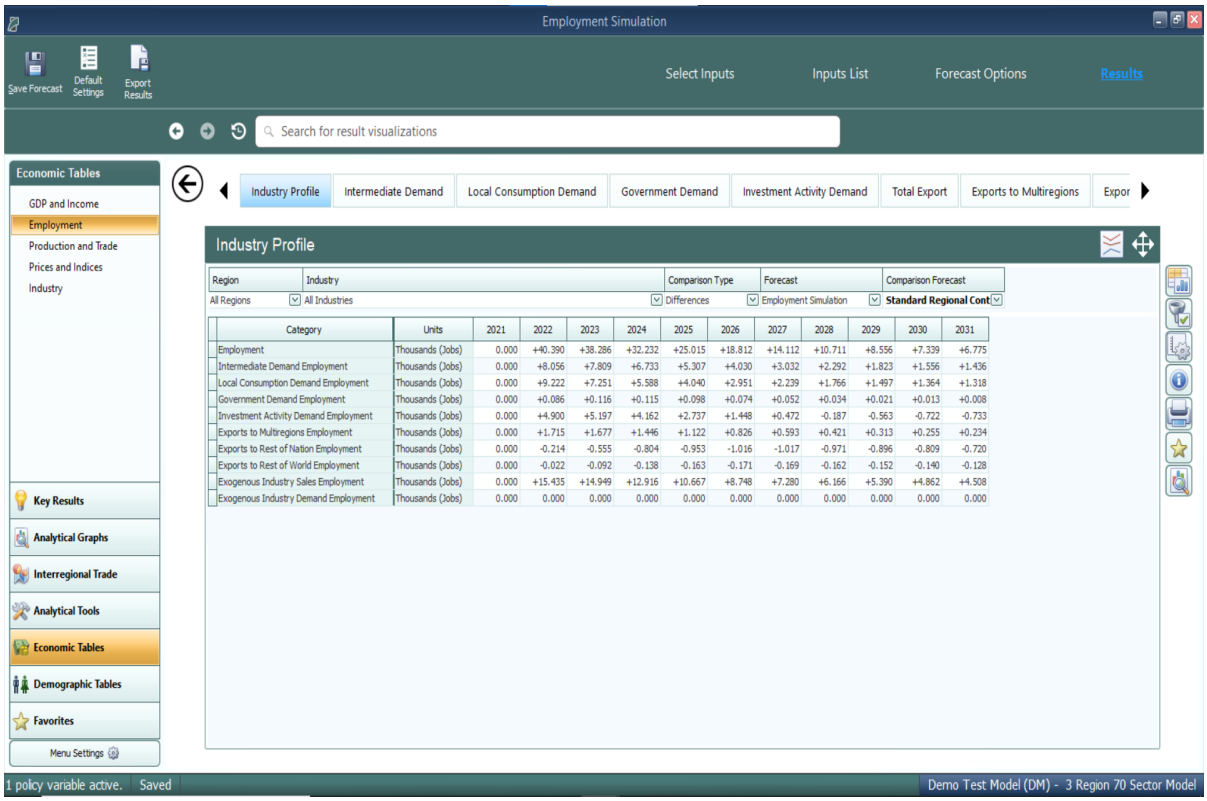


Figure 59: Results – Tabbed View

Figure 60: Results – Rows View

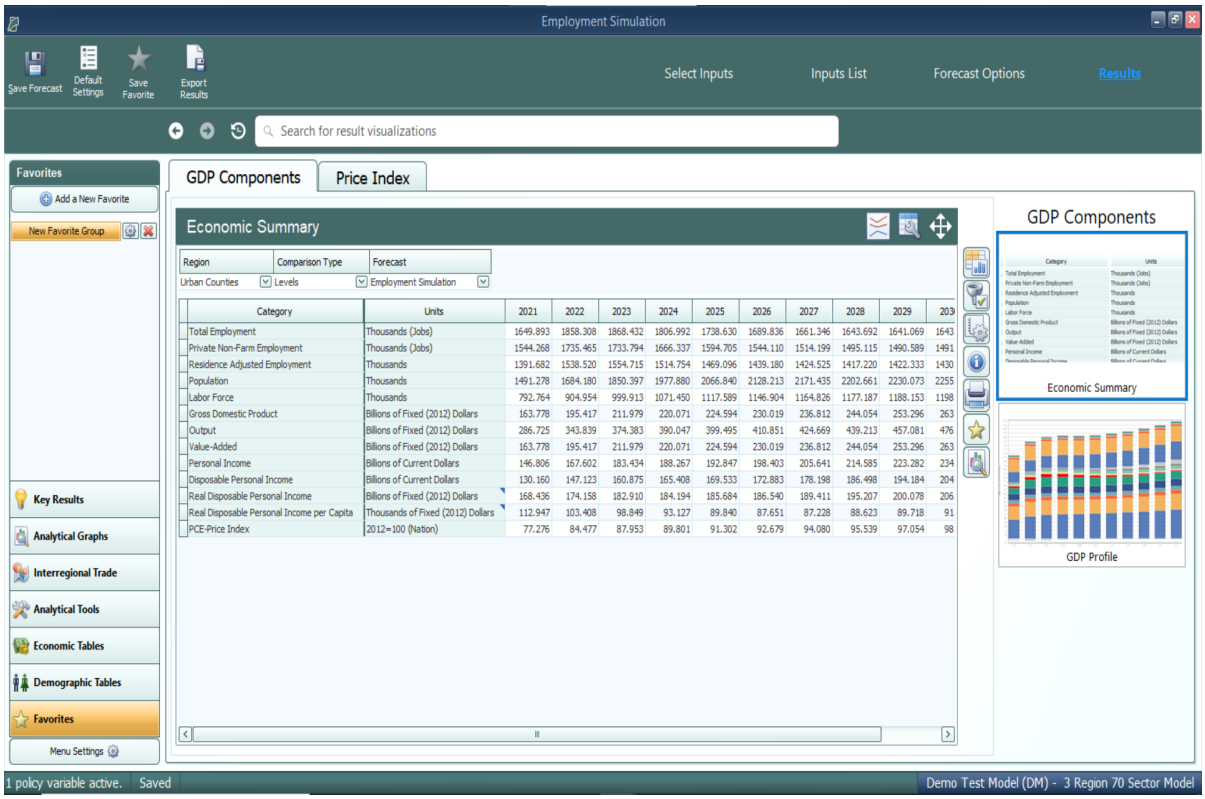


Figure 61: Results – Gallery View

Results Preferences

You can change what types of options are visible in the main navigation bar by clicking **Menu Settings** at the bottom of the bar, as shown in **Figure 62**. Using the drop-down menus, each group of options can be specified to appear in all forecasts, no forecasts, control forecasts, or simulations. The **Default** setting will revert an option to the forecasts it appears in when you first begin using the model.

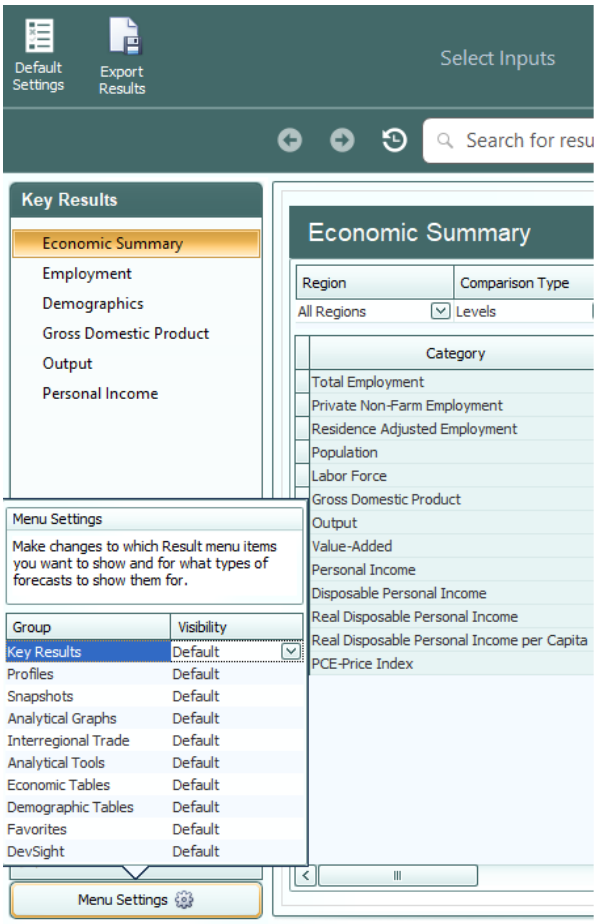
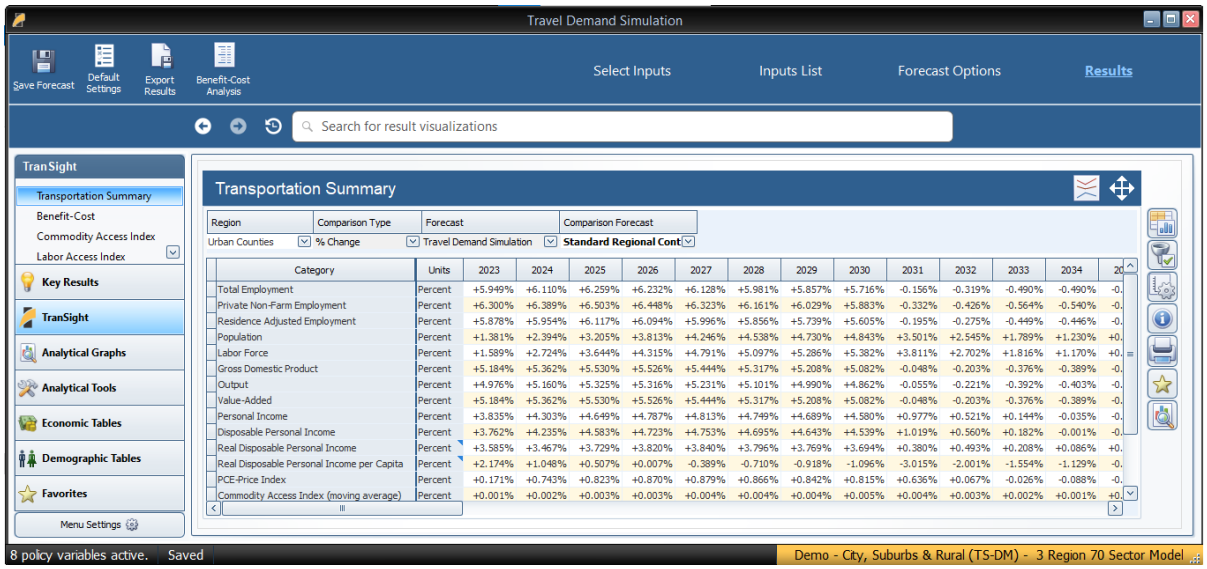


Figure 62: Menu Settings

TranSight Results

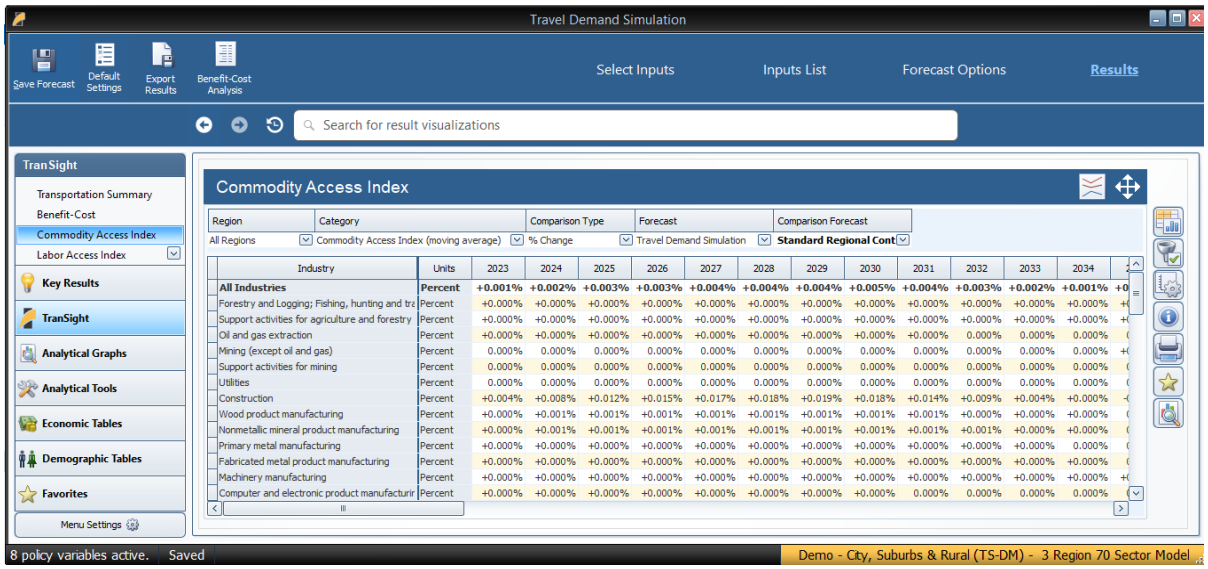
On the top of main navigation menu under the TranSight heading, you will find TranSight specific result visualizations that have been created by REMI. While much of the data contained within could also be viewed in a TranSight model, the ones shown here have been selected as a collection of information most relevant to transportation studies.

Transportation Summary



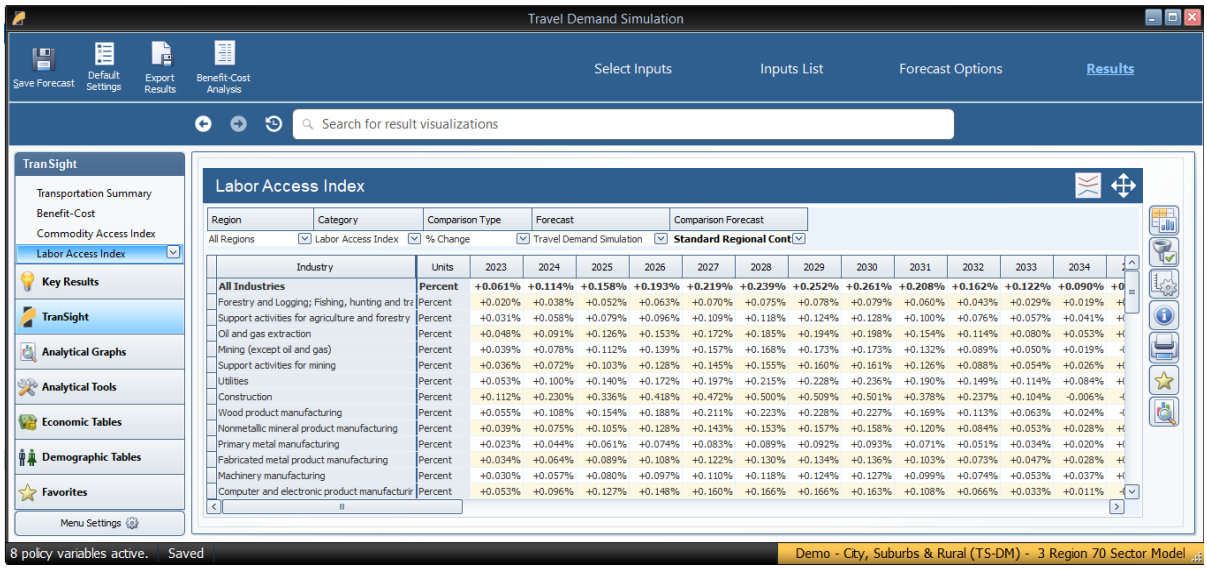
The Transportation Summary tab gives you a summary of the main population, output, GDP, and labor force changes as a result of your project.

Commodity Access Index



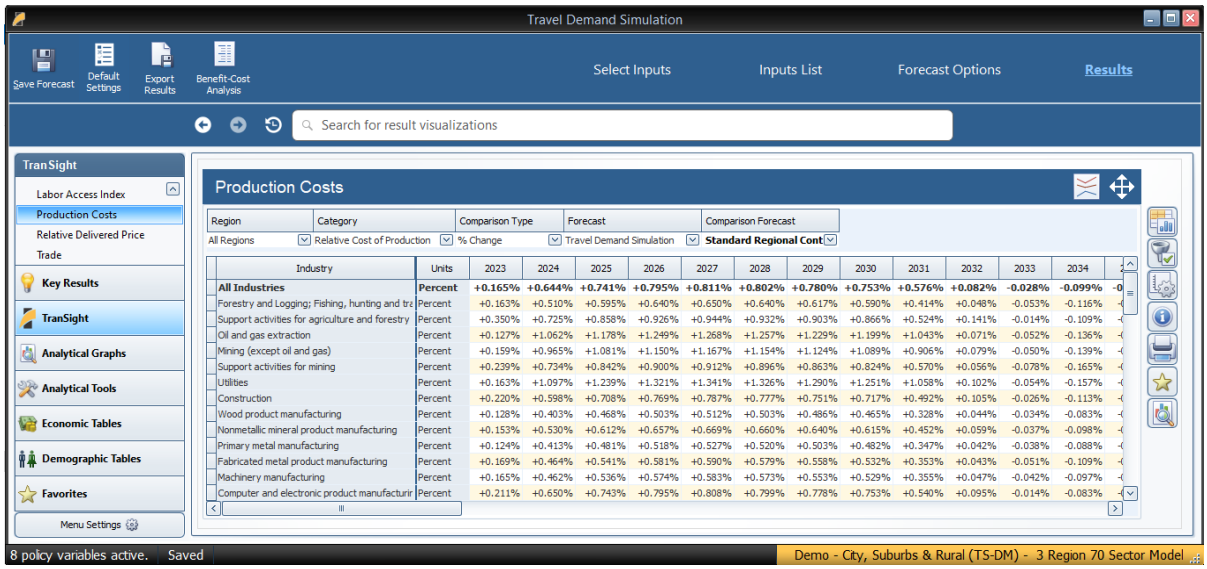
The Commodity Access Index measures the change in access to specialized inputs into production in order to predict the change in the productivity of intermediate inputs.

Labor Access Index



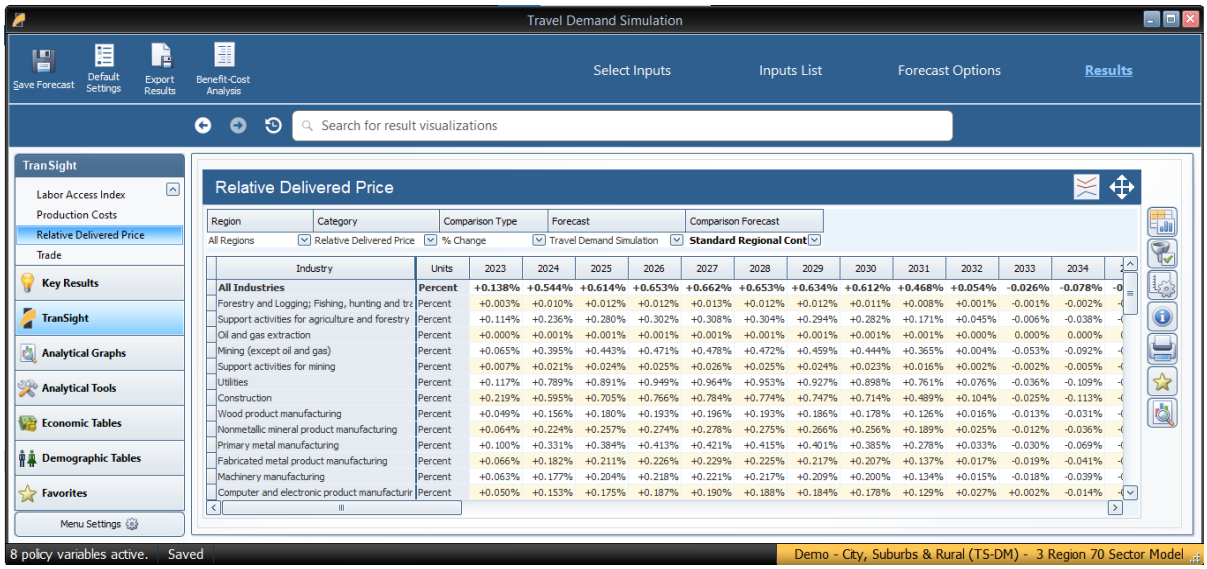
The Labor Access Index estimates the effect of access to labor choice and individual characteristics by occupation and industry on labor productivity.

Production Cost



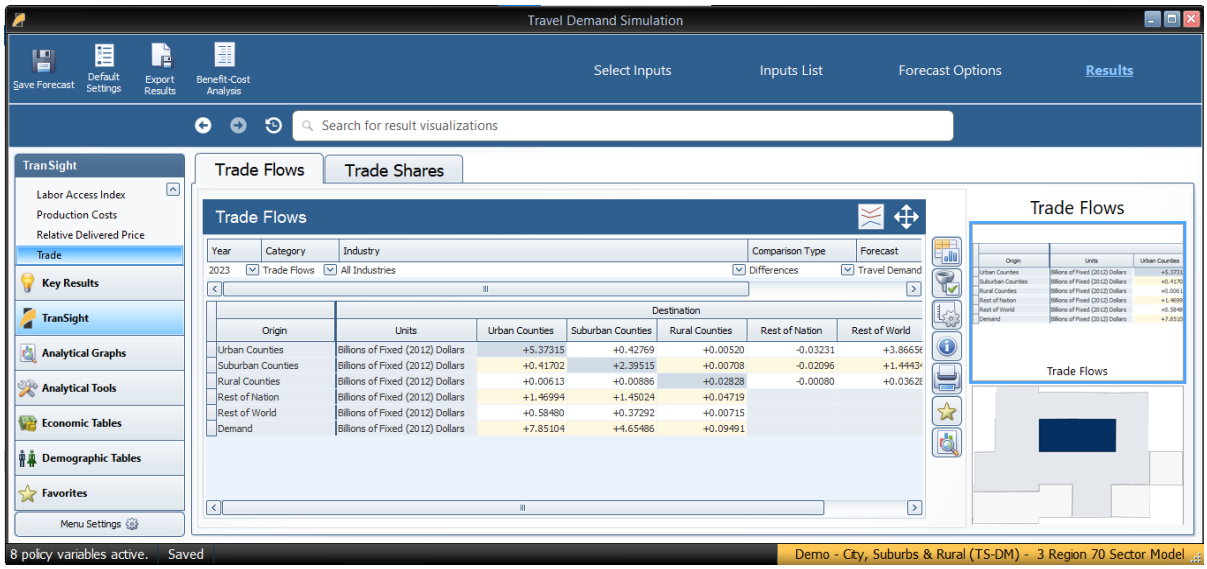
Production Costs shows how your inputs affect the cost of production.

Relative Delivered Price



This tab measures the change in the actual price of a product at point of origin and factors in transportation cost.

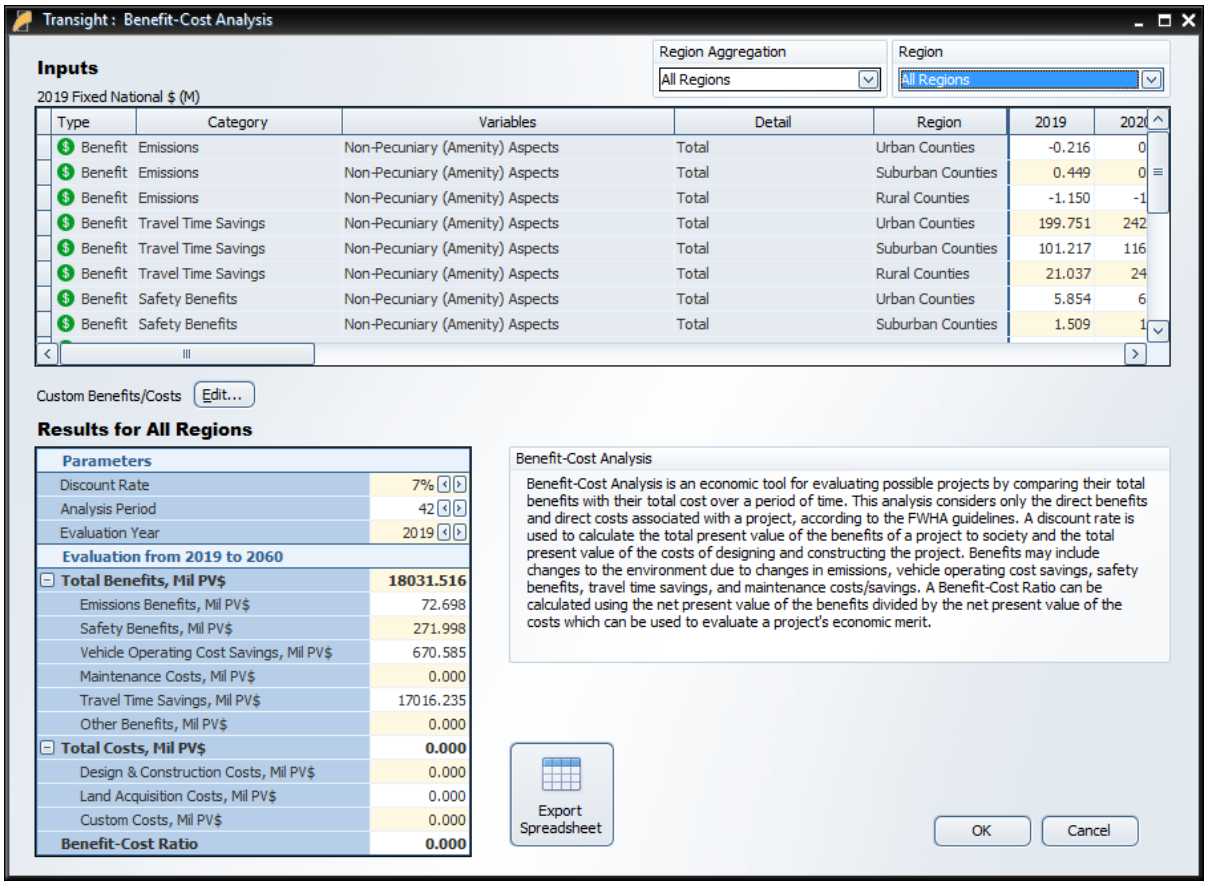
Trade



The Trade tab summarizes the impact on trade imports and exports to and from your region, as well as taking into account the rest of the nation and world economies.

Benefit-Cost Analysis

Another useful tool available is the Benefit-Cost Analysis table. It is available only after running a travel demand scenario. In the results tab, click **Transportation** and then **Benefit-Cost Analysis**.

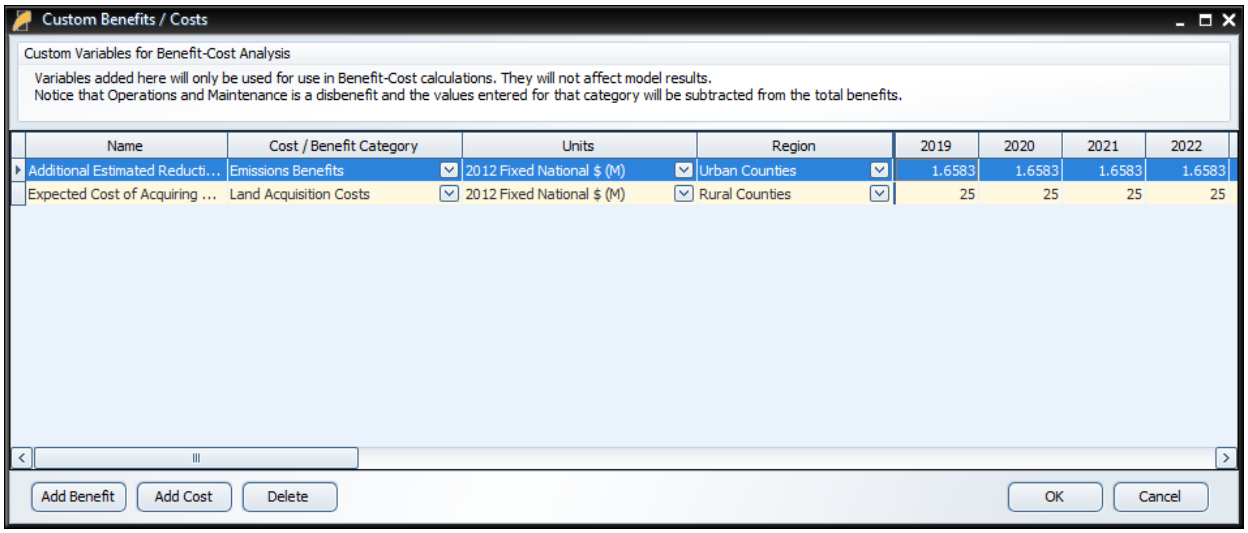


Benefit-Cost Analysis is an economic tool for evaluating possible projects by comparing their total benefits with their total costs over a period of time. This analysis considers only the direct benefits and direct costs associated with a project, according to the FWHA guidelines. A discount rate is used to calculate the total present value of the benefits of a project to society and the total present value of the costs of designing and constructing the project. Benefits may include changes to the environment due to changes in emissions, vehicle operating cost savings, safety benefits, travel time savings, and maintenance costs/savings. A Benefit-Cost Ratio can be calculated using the net present value of the benefits divided by the net present value of the costs which can be used to evaluate a project's economic merit.

The top portion of the Benefit-Cost Analysis screen shows the inputs to the benefit-cost calculations. They are the policy variables included in the travel demand scenario categorized by cost or benefit type. Additional benefits and costs may be added using the Edit button below the inputs grid.

The lower portion of the Benefit-Cost Analysis screen calculates the present value of those direct benefits and costs by category along with the Benefit-Cost Ratio. The discount rate, analysis period, and evaluation year for these calculations can be specified in Parameters section of the table.

You can add any benefit or cost to your Benefit-Cost Analysis by clicking **Custom Benefits/Costs**. After you click **Add Benefit** or **Add Cost**, the Custom Benefits/Costs Creator will ask you to specify a name, cost/benefit category (for including on the totaled list of results by category on the Benefit-Cost Analysis screen), units, and a region for your new cost or benefit. The policy variable for a custom benefit or cost will always be listed on the Benefit-Cost Analysis screen as "N/A".



You can export figures shown in the Benefit-Cost tool by clicking **Export Spreadsheet** toward the bottom of the tool.

Favorites

The Favorites section is intended to allow users to build their own preferred tables, charts, and maps and arrange them however they would like. Favorites are saved and can be viewed for every forecast that you run. To add a new favorite group, select the **Favorites** group on the main navigation bar and click on the **Add a New Favorite** button. After prompt to name the new favorite group, a table creation tool will launch.

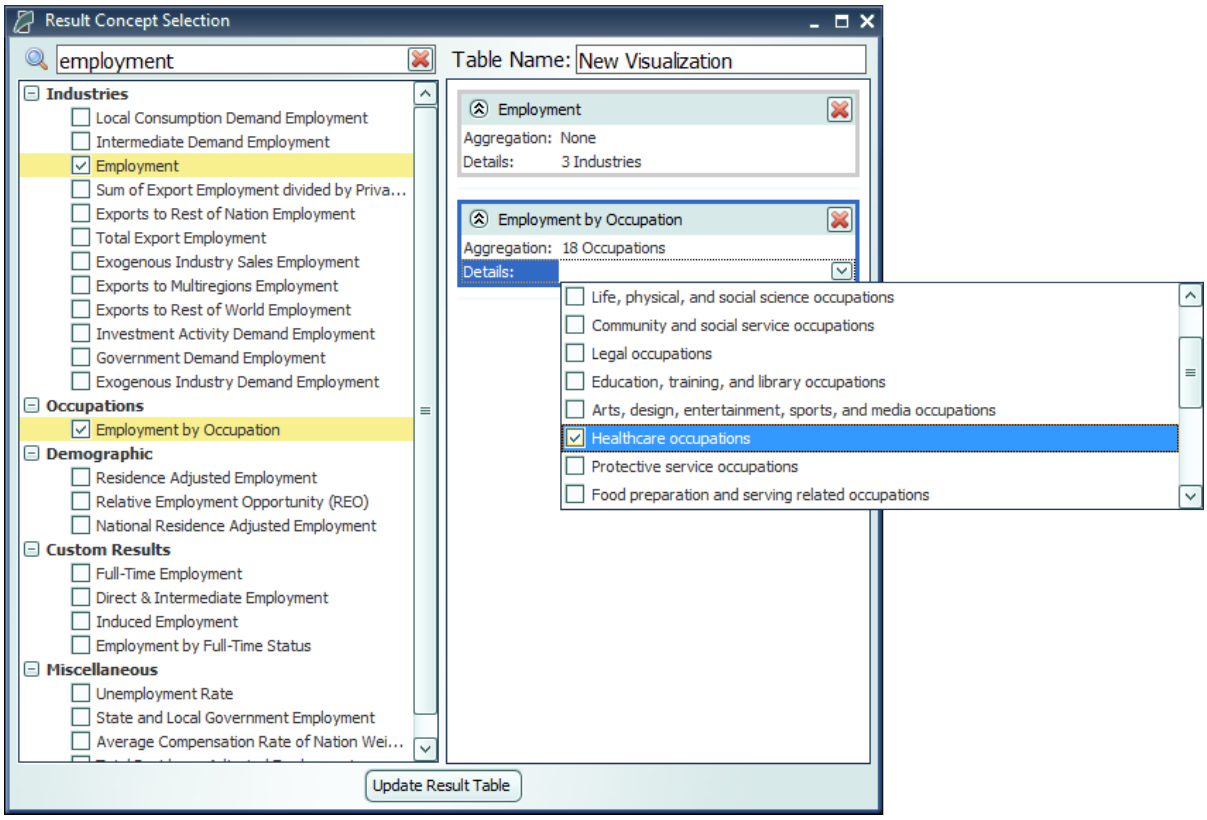


Figure 63: Result Table Creator

The table creator features a full list of every result concept available to the current type of forecast, sorted by detail category. Use the search bar to filter down the long list. Selected concepts will be displayed in the list on the right for ease of keeping track of what has been selected, removing any no-longer-wanted concepts, and lastly, for specifying further information about selected concepts in certain situations. More information will be required when multiple concepts are chosen to be added to a table and they do not all have the same detail category, for example if one variable has industry details and another has age, race, and gender details. In this case, the resulting visualization will need to display values for each concept and a fixed individual detail, like Employment – Construction rather than general Employment with a combo-box filter for switching the industry. Each selected detail can come from an aggregation, if desired, and ultimately will be added to the finished table as separate line item. Clicking the 'Add to Favorites' star button the right hand of the screen also brings you to a new favorites preview screen. This allows you to configure custom options like comparison type, legend display, and more to match your personal preferences. It also allows you to see exactly what your favorites graph will show, giving a more personalized way to construct favorites.

After a new favorite group is created, it will appear in the Favorites section of the main navigation bar. When the favorites group is selected, two buttons will appear next to it, one to delete the group and one to open the **Favorites Editor**. The Favorites Editor can be used to customize the favorites group. It can be used to add, remove, or reorder visualizations and change the layout style. Visualizations can also be arranged in groups which will have a different effect depending

on the layout type. In gallery mode, each group will appear on a separate tab, in row mode each group will appear in a separate row, in list mode each group will appear in a different column, and in tile mode each group will form a separate tile group.

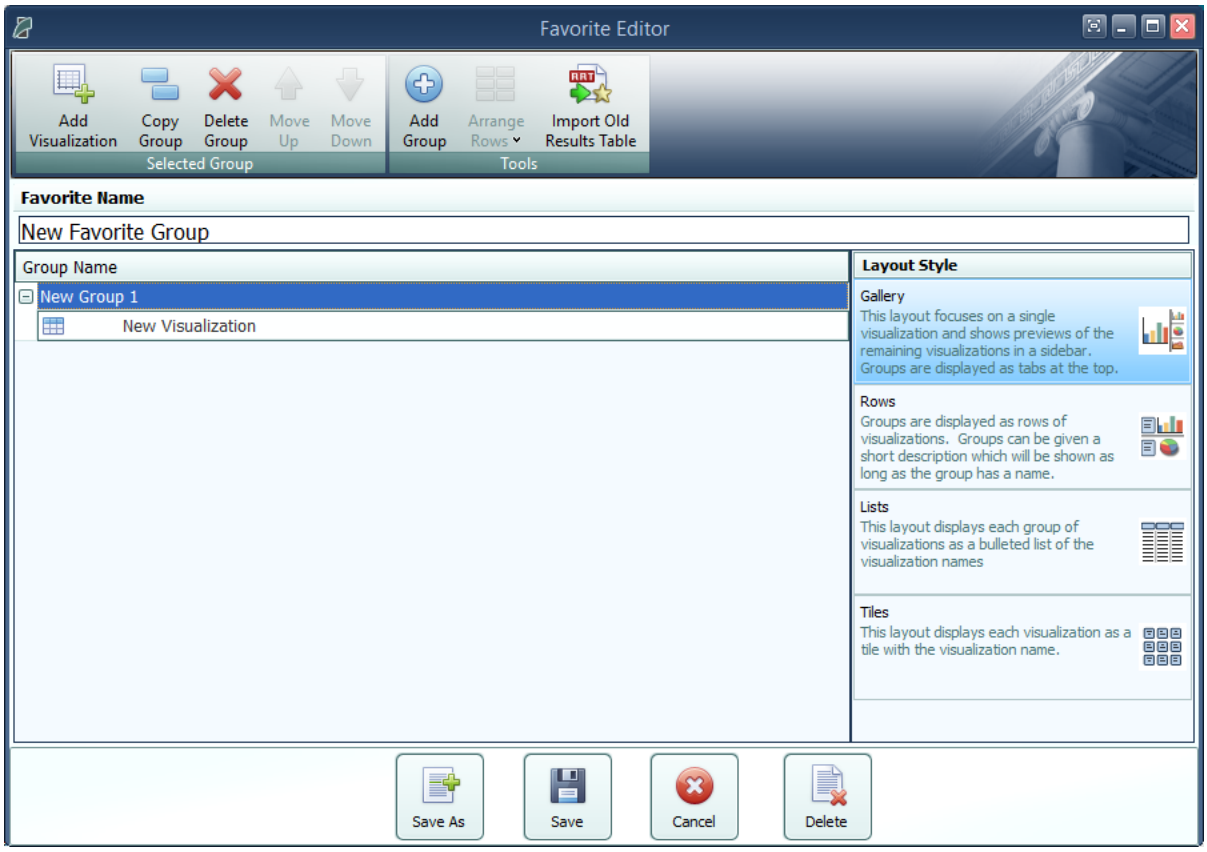


Figure 64: Favorites Editor

Favorite visualizations have a button on their title header panel that will let you re-open the table creator to adjust their contained data. There are several more options for Favorites that are described in the section below in the context of the many options available for interacting with visualizations.

Interacting with Visualizations

As you navigate the results and click around on visualizations, you will notice that a group of six buttons consistently appears to the right of the most recently selected data visualization. These buttons provide important ways of interacting with the selected visualization. The first three buttons each open pop-up menus that respectively allow for changing the chart-type, modifying the included data, and updating the visualization's settings. The fourth button opens a pop-up text field containing a description of the result concepts currently included in the visualization and the fifth adds a copy of the selected visualization to the Favorites. The last button will open the visualization in the **Explore Connections** tool.

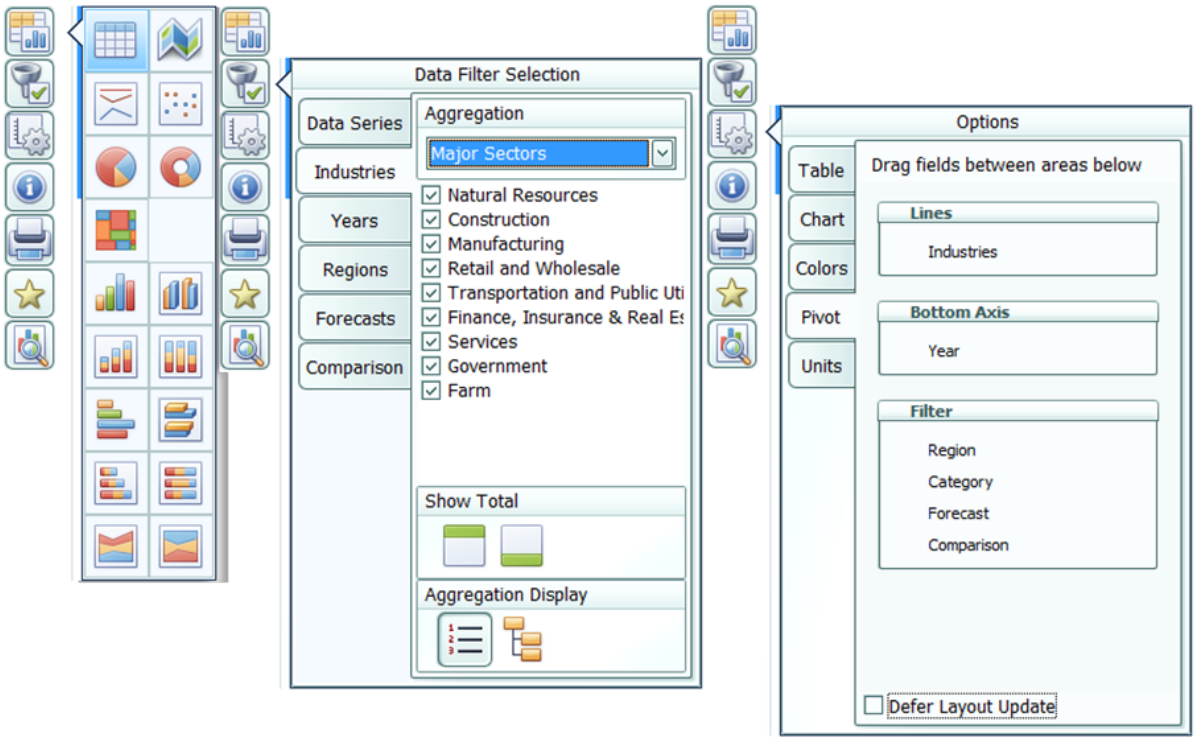


Figure 65: Data Visualization Interaction Buttons and Menus

The chart-type menu lets you switch a visualization between showing a table, map, or fifteen different types of charts. Once you have selected a chart-type option, another menu will open that lets you choose between each of the different ways your data could fit into the new type of chart, with visual previews of each of the available configurations.

If you want to change what data is being shown on a visualization, look in the data selection menu accessed using the second button from the top with the filter icon. This menu has several tabs that each focus on a separate aspect of the data included in the visualization. In the data series tab, you can toggle whether any of the included data series are visible in the chart, remove them altogether, and add new data series using the result table creator. On the other tabs, which vary depending on what details are associated with the data series being displayed, you can change what details are being shown. You can choose to hide or show each region, year, comparison forecast, comparison method, and other detail. There are also options for changing the aggregation level of the displayed details, adding totals, and introducing hierarchy to the layout of the result table in order to see values for multiple aggregation levels at the same time. It is also possible to access the filtering options by right-clicking on a column header in the grid, this will pop up the filter options specific for the field that column represents.

The options menu, shown furthest to the right in **Figure 65**, has a few more options for modifying the current visualization. For certain chart-types you can choose to enable sorting, pick alternate color schemes, and change the decimal precision of listed values. You can also change the displayed units and use the pivoting tool to restructure the chart entirely by dragging different

dimensions of the result data into the different pivot-able destinations afforded by the chart-type. For example, in the pivot menu shown above, industries are currently being displayed down the rows of a table, years along the columns, and the remaining detail types in the filter combo-boxes. This can be altered in any way by dragging these data dimensions between the different groups, although putting too many dimensions onto the rows or columns of a table or either of the two axes on a chart might cause the visualization to take a very long time to finish updating. It is also possible to pivot from the grid directly by left-clicking on a column header or filter combo-box and dragging it to the column or filter position you want it in.

There are several other ways of interacting with and modifying visualizations outside of the main visualization buttons. Master selection, which is located at the top of the window on the header panel, should be turned on when you would like to make changes to all visualizations at once such as changing the focused region or selecting the visible years. Another useful feature is the full-screen button. This button can be found on the top right corner of any visualization's title area and will toggle full-screen mode for that visualization. When viewing charts or maps, a **Show Table** button appears next to the full screen button that will show a table of values that correspond to the displayed chart or map.

Searching for Result Tables

Toward the top left corner of the results screen is a search bar where you can search for names of tables and visualizations in your forecast. The results search is used to search for entire tables and visualizations, and can return visualizations based on partial matches. It also shows you the path to take to get to that result, going through Key Results, Analytical Graphs, and Demographic Tables for example.

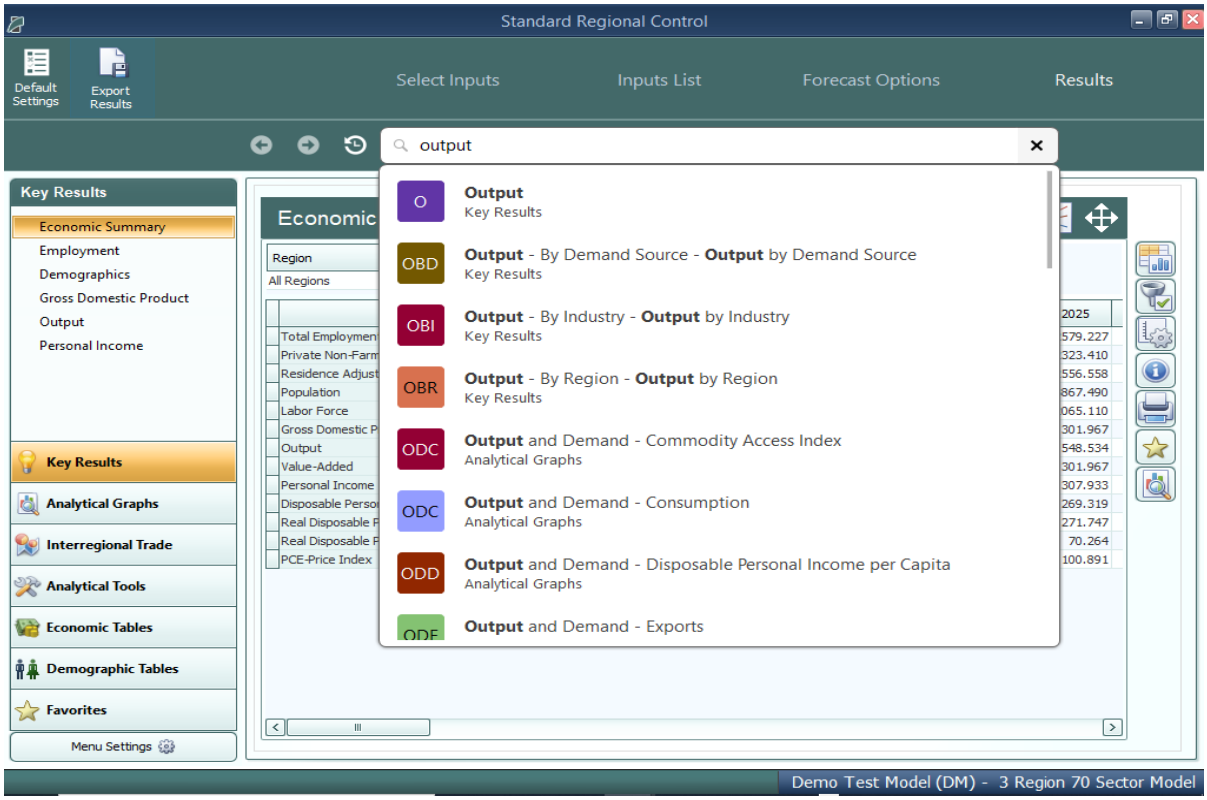


Figure 66: Results Search

Conditional Formatting

You can use conditional formatting to visually categorize results in tables. You can find conditional formatting in any forecast by clicking the **Options** button to the right of any table and viewing the **Table** tab. You will be able to choose color scales, data bars, or icons to automatically categorize your results into low, mid-range, and high categories. You can also click on **Top/Bottom Rules** to choose to highlight the top or bottom ten results in your table, all results that are above or below average, or all results that are in the top or bottom tenth percentile of the table. Tables will automatically clear themselves of all conditional formatting when you navigate away from them.

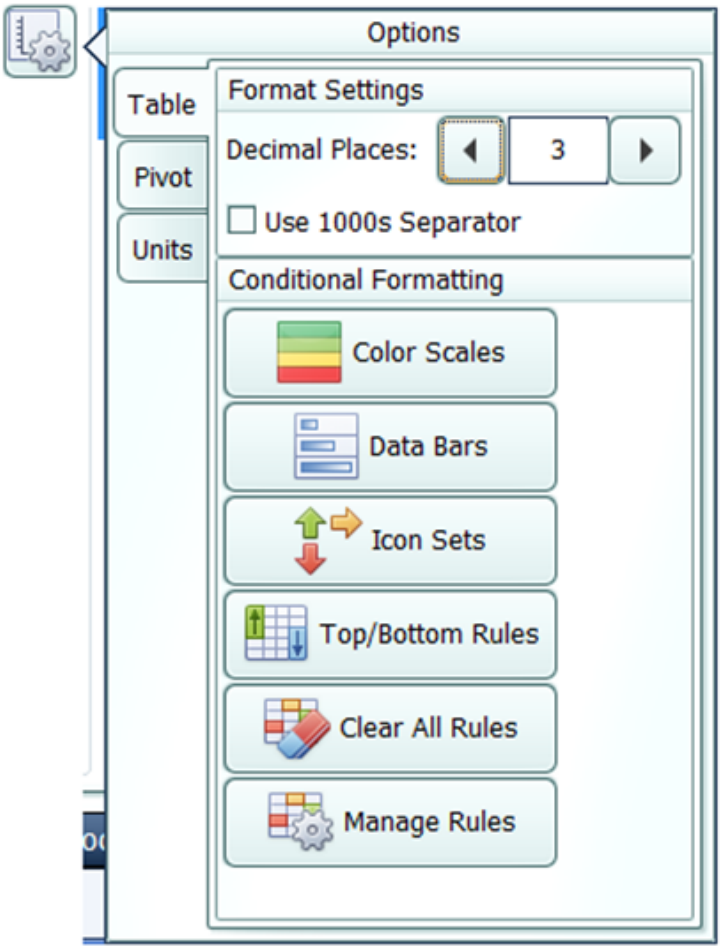


Figure 67: Conditional Formatting

Impact Ranking Tool

The impact ranking tool is a feature of forecast charts that can show where in the economy a policy will have the greatest or least impacts. To view charts that show the impact ranking tool by default, go to the Analytical Tools panel in the forecast results and select the Impact Profile option. Over the top of the chart, click on the **Ranked** tab as shown in **Figure 68**. As shown in **Figure 69**, the tool will appear as a menu where you can select how many ranked items to show and what year of impacts to reference. For other charts, the tool can be made visible by clicking the **Options** button, navigating to the **Chart** tab, and selecting the order in which impacts should be displayed as shown in **Figure 70**. Impacts are ordered by magnitude (e.g., an impact of -5 jobs will be considered greater than an impact of 2 jobs.) Impact ranking is not available for certain chart types.

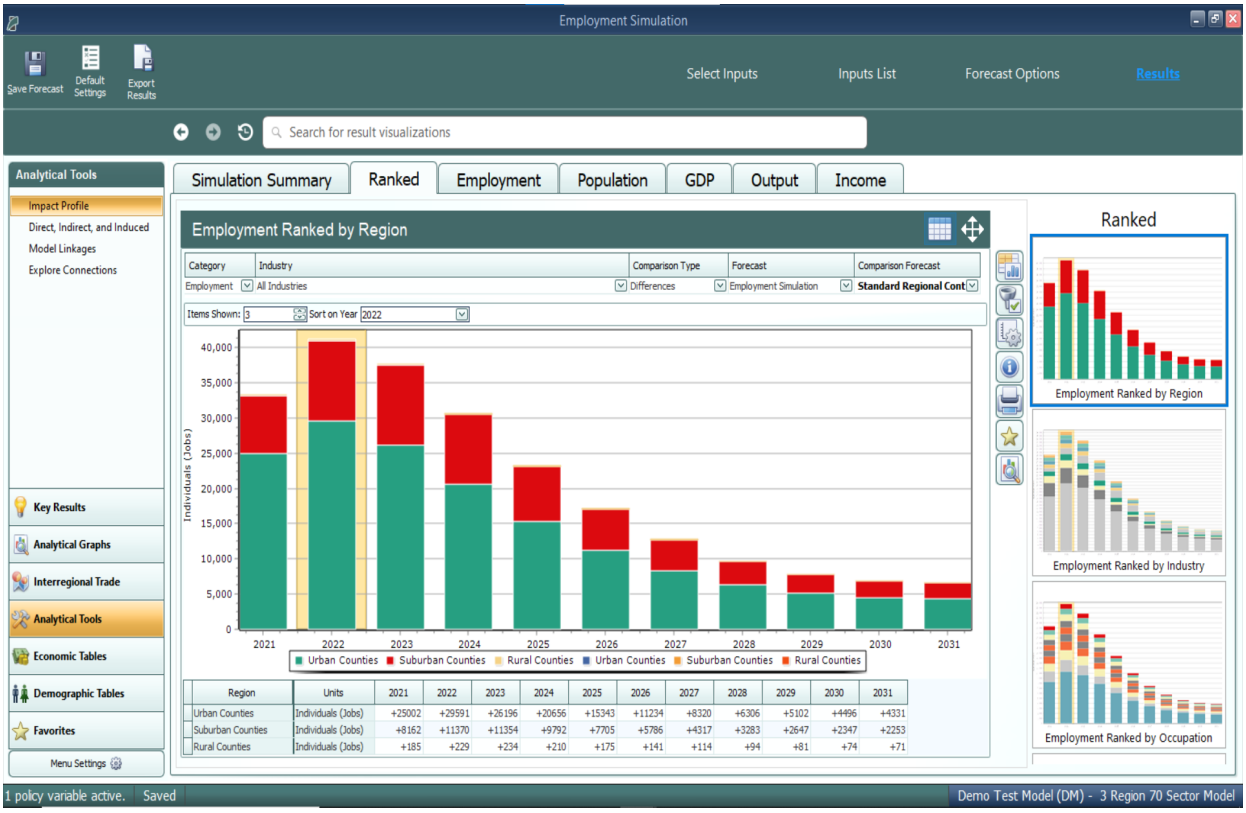


Figure 68: Ranked Visualizations

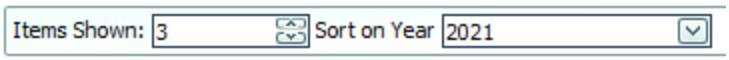


Figure 69: Impact Ranking Tool

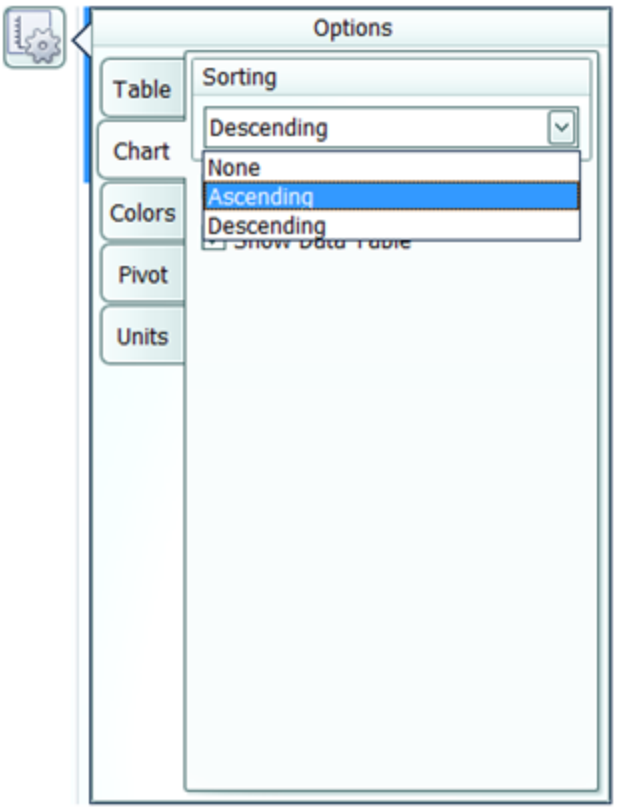


Figure 70: Making the Impact Ranking Menu Visible

Connections Explorer

The Connections Explorer is designed to allow you to go through the REMI model step-by-step to see the effects of individual policy variables. It will show you a policy variable or result that you have selected along with the other variables in the model that are connected to it. The Connections Explorer can be accessed in the Results section of regional forecasts by going to the Analytics panel and selecting **Explore Connections** as shown in **Figure 71** or by clicking the **View in Explorer** button to the right of any result visualization as shown in **Figure 72**.

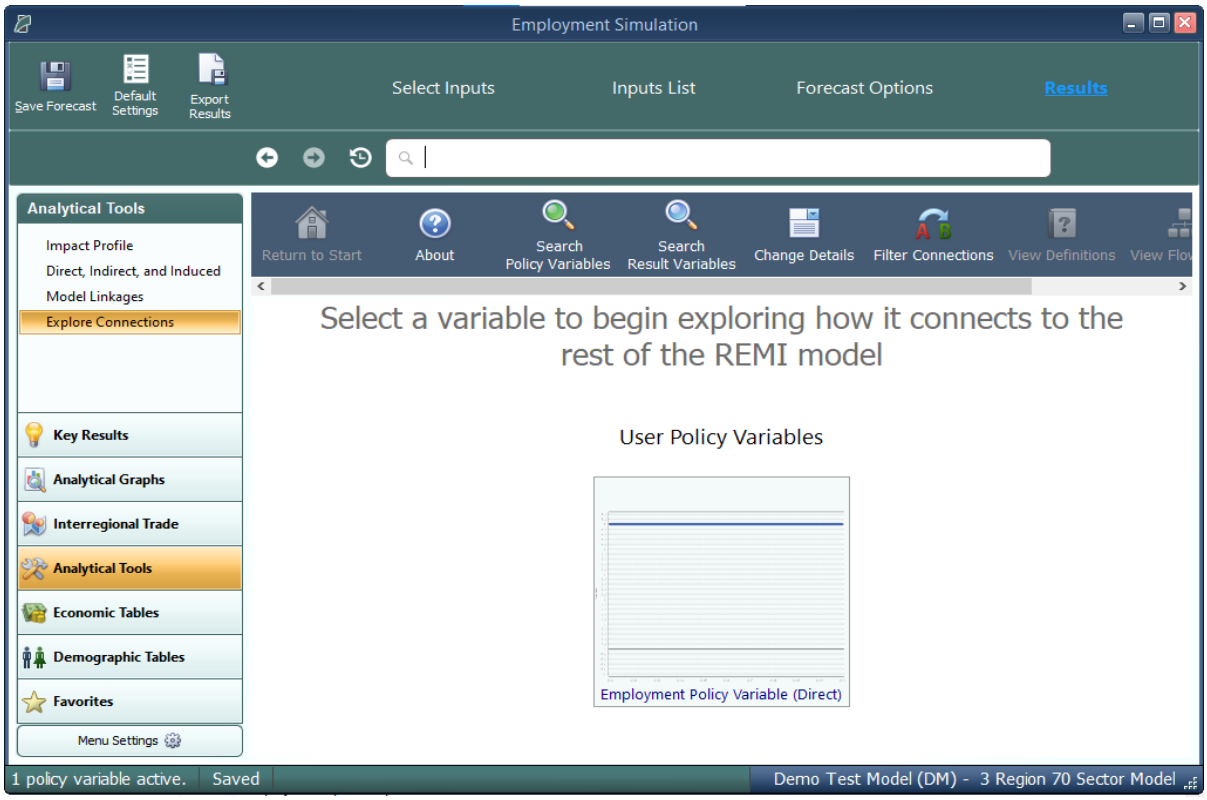


Figure 71: Opening the Connections Explorer

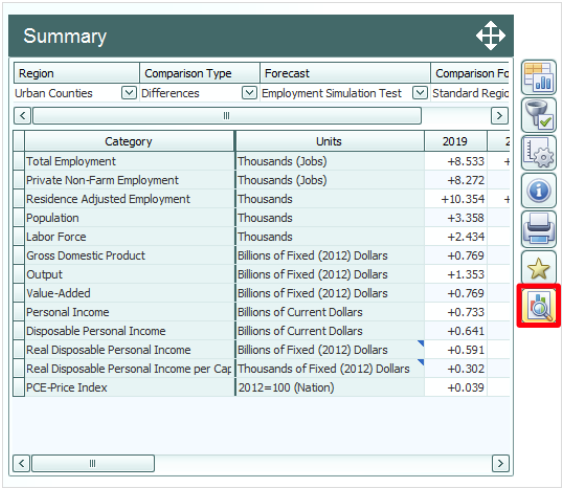


Figure 72: View in Explorer

As shown on **Figure 73**, the Connections Explorer contains graphs of policy and result variables over the forecast period. Clicking on the graph of a variable you are interested in will enlarge it. Once your variable is enlarged, the feature also displays a **Determinants** column that lists any variables that directly affect your variable and a **Dependents** column that lists any variables that your variable directly affects. To make changes to the details that are displayed for each variable, you can make changes to the drop-down menus just above the visualization. You can also make

changes to the details displayed and the detail aggregations used by clicking the **Change Details** button on the top bar.

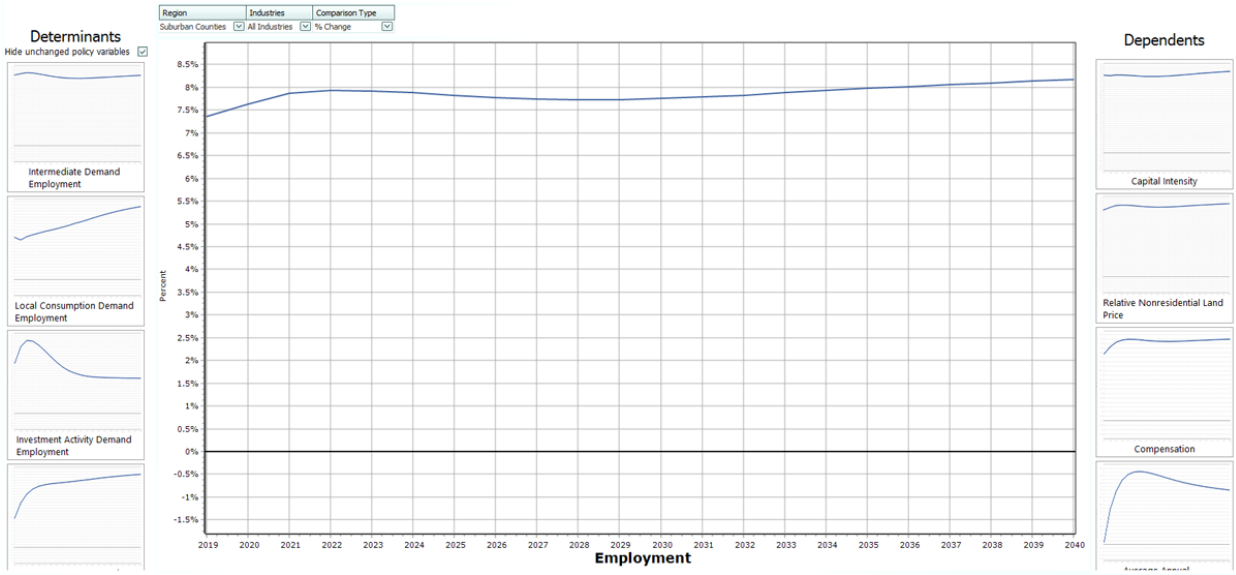


Figure 73: Viewing a Variable in the Connections Explorer

To search for a specific policy variable, click the **Search Policy Variables** button on the top bar as shown in **Figure 74**. You will be able to search for available policy variables with the search bar or choose from the list. The policy variables that are active in your simulation are listed first. Similarly, to search for a specific result variable, click the **Search Result Variables** button next to Search Policy Variables. You will be able to search from available result variables with the search bar or choose from the list.

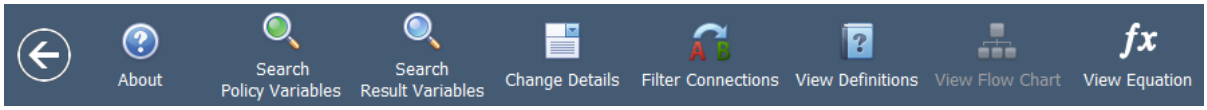


Figure 74: Top Bar of the Connections Explorer

To see how REMI defines variables, click the **View Definitions** button on the top bar. This will show you the definition of the variable you are currently viewing along with the definitions of any determinant or dependent variables being shown.

Equation Viewer

To see model equations that involve your variable, click on the **View Equation** button on the top bar as shown in **Figure 75** to open the Equation Viewer. Your variable that you are currently viewing will be shown in red. You can click on any variable in the equations to view its name, definition, and in some cases a **View Variable** button that will show you the graph of that variable along with its determinants and dependents.

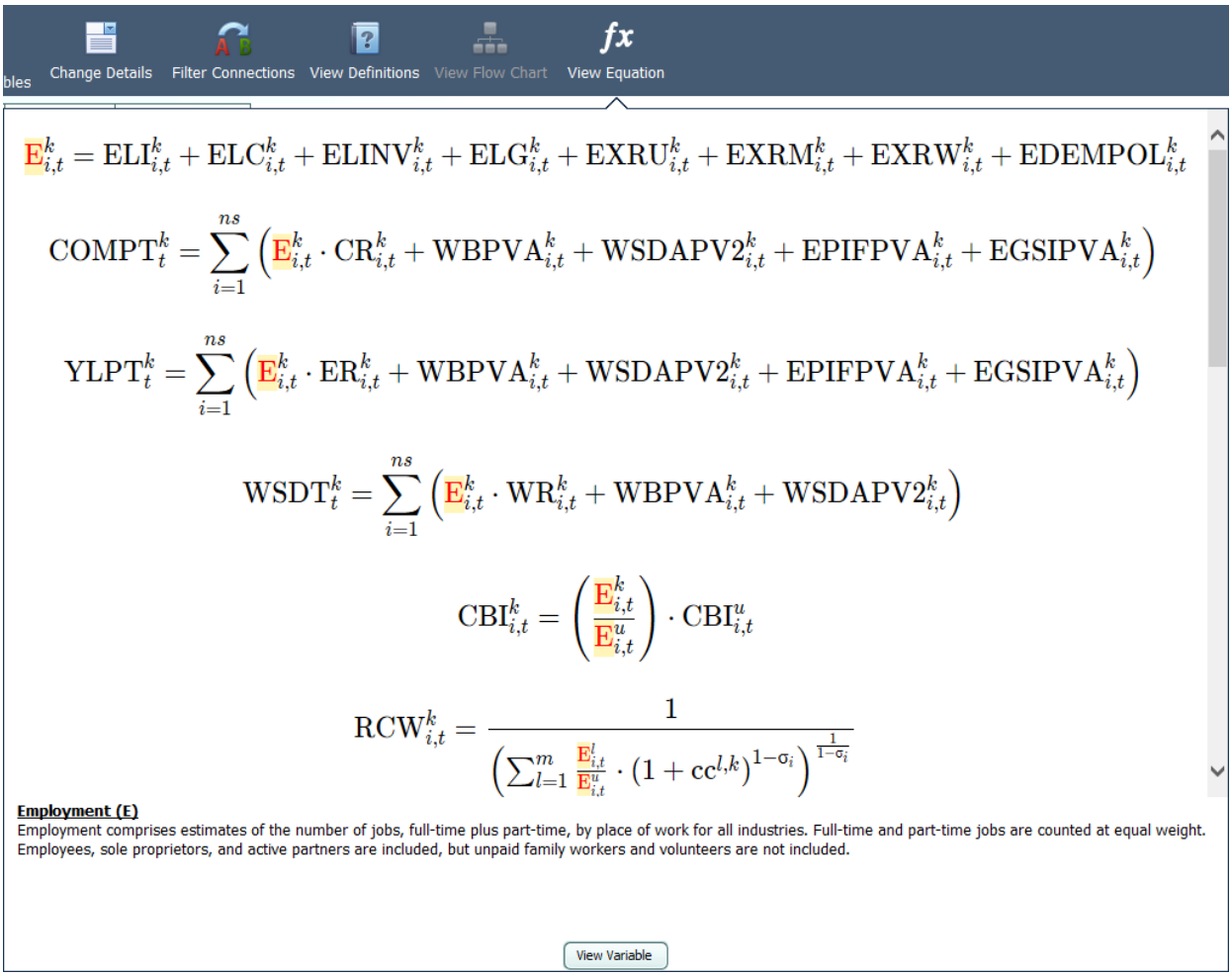


Figure 75: Equation Viewer

Stepping Through the Model

To view one of your variable's determinants or dependents, click on that variable in the relevant column. The visualization of that variable will be enlarged, and the Determinants and Dependents columns will be replaced with your new variable's determinants and dependents. To return to your old variable, simply search through the relevant column, where it will be outlined in blue. By clicking on determinants and dependents, you can "step through" the model and the interactions between variables.

Connections Explorer Filter

To automatically map out relationships between any two variables, click on the **Filter Connections** button on the top bar to access the Connections Filter, which is a search feature for linkages between specific variables. Type the starting and ending variables for the paths you want to map out. The Connections Filter will show a connections map which will represent up to 12 of the most direct paths between the two variables. Paths that are more than 20 variables long will not be shown. To view the entire map at once, press the **Zoom Out** button in the top left corner of

the map. To begin tracing through the paths between your starting and ending variables, click one of the **Apply Filter** buttons below the connections map as shown in Figure 66. You will then be shown your starting variable, and will be able to step through either all the paths that were shown on the connections map or the single selected path, with all other variable relationships filtered out. When you are done with the Connections Filter or would like to see all possible determinants and dependents for your variable and not just the ones found on the connections map, bring up the Connections Filter again and click the **Remove Filter** button.

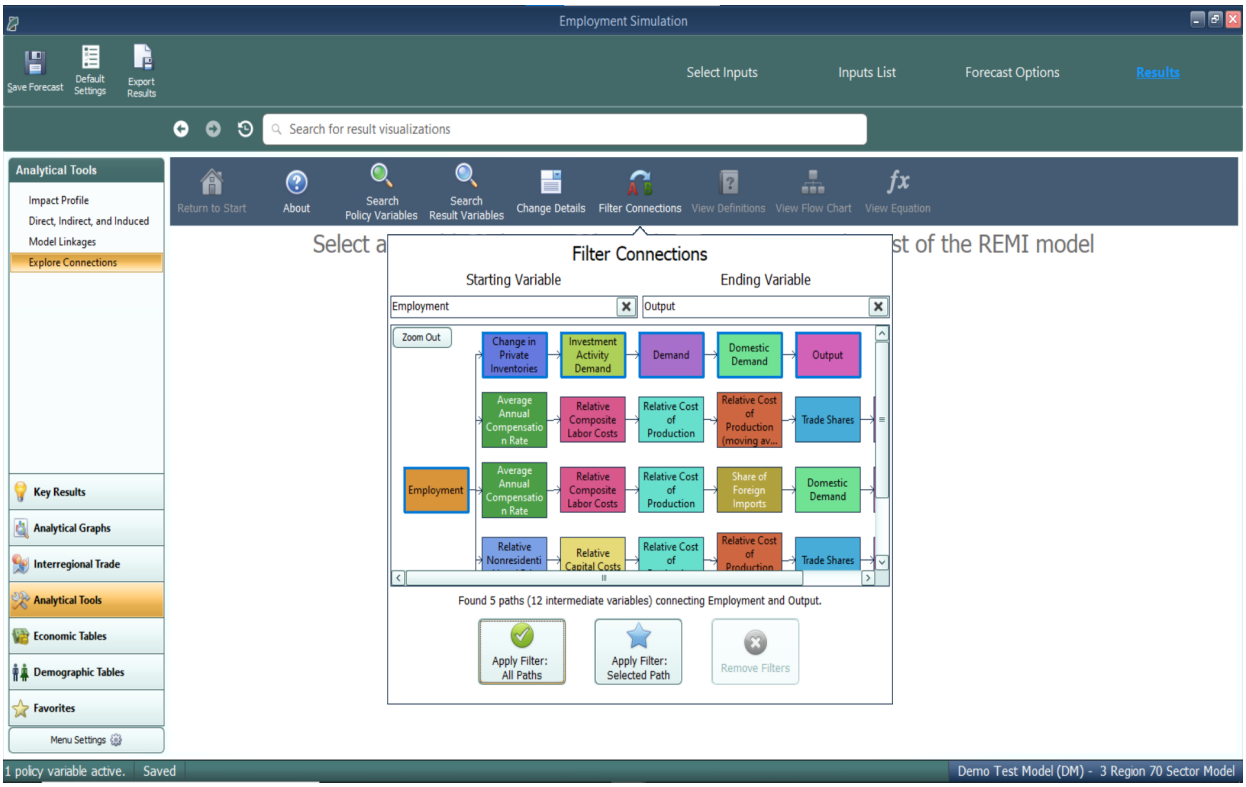


Figure 76: Connections Filter

Purpose of the Connections Explorer

The Connections Explorer shows you connections between policy variables and results, but in simulations with multiple policy variables active, it cannot isolate the effects of each policy variable. Exploring the effects of multiple policy variables at once will make the cause and effect relationships between policy variables and results become unclear and confusing, since there is no way of seeing which effect was caused by each policy variable. Because of this, we recommend using the Connections Explorer on simulations with a single policy variable active. The policy variable should be applied to only 1 region, 1 industry, 1 commodity, etc. A specific example of how the Connections Explorer can be used to solve issues in a policy analysis is given in the documentation.

Exporting Results

In order to export forecast results from TranSight, you will need to locate the **Export Results** button on the navigation header bar, between the save and options buttons. This button launches the **Data Export Center**, which is the home for all result exporting. The interface of the export center has options for deciding what content should be exported, as well as the export file format, and some additional settings. When exporting multiple visualizations to an Excel Workbook, visualizations are each placed on a separate spreadsheet tab.

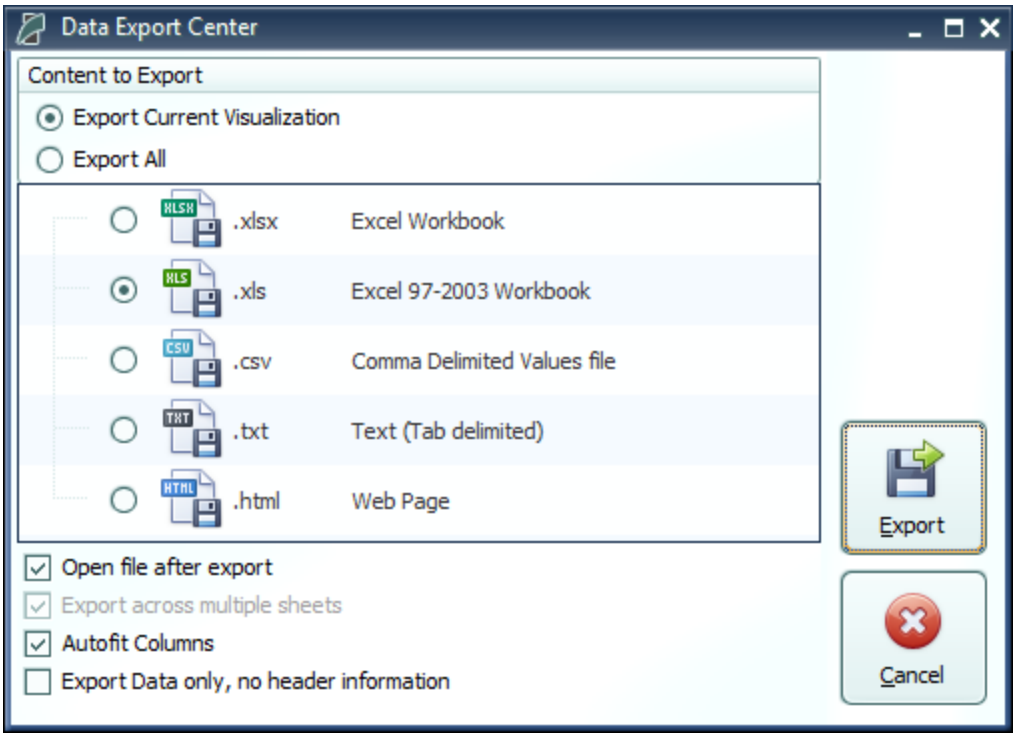


Figure 77: Result Export