

# Run Analysis Scenario in PE

Use the following steps to perform a work plan optimization:

1. Open the Optimization Analysis window.
2. In the left pane, select **Actions** or right-click and select **Insert**. The application creates a new application.
3. Highlight the text in the Scenario Name field and then type the name for this optimization.
4. Select the Year of Condition Data field and then enter the year (in the format YYYY) of the most recent condition data that will be used in the optimization. The year given in this field determines the starting year of the results of the optimization, which is the entered year plus one.
5. Select the Analysis Length field and then type the number of years covered by this analysis.
6. If you wish to save the details of the optimization for further study, click the Save Details check box. (The details can be viewed in the Detailed Optimization Results window.)
7. For the Decision Tree Set field, click the down-arrow and select the decision tree set you wish to use in the optimization.
8. To limit the data that is used in the analysis, right-click in the left pane and select **Edit Scope**. This command displays a data selection window that you can use to select what data is used in the analysis.
9. To include the projects and costs from one or more work plans in the optimization, right-click in the left pane and select **Edit MWP Scope**. This command displays a data selection window that you can use to select what data from the work plan is used in the analysis. See [Include Projects from a Work Plan](#) for more information on including MWP data.
10. To use a discount rate (that is, the value of money over time) and/or inflation in the analysis, complete the records in the Yearly Fin. Params pane.
11. You are now ready to enter the records for the objective and constraints of the optimization. The first record in the Constraints pane should be for the objective of the optimization. To enter the record for the objective of the optimization, follow these steps:
  - a. In the right pane, right-click and select **Insert**. A new record is added to the pane.
  - b. Click the Is Objective check box.
  - c. Click the down arrow in the Constraint Column column and select the desired objective.
  - d. Depending on the objective selected, only a certain value may be permitted for the Constr. Type column and so the application automatically sets this column. If this does not occur, click the down arrow in the Constr. Type column and select the appropriate constraint type.

**Note:** You can configure multiple objectives for PMS optimization analysis. In this case, the Constr. Type column should be set to **Weighted Average** for each objective, with each objective's "weight" entered in the Objective Coefficient column. (If the units of the objectives are different, the software will normalize the weight coefficients.)

12. After configuring the objective(s) for the analysis, one or more constraints can be configured. (If only one constraint is configured, select the Run Simple Algorithm check box in the left pane.) A constraint record can apply to all years in the optimization period or multiple constraint records can be created for each year in the optimization period. Finally, for those constraints that have subdivisions as configured in the [Setup Constraint Subdivisions](#) window, you can create records for each constraint subdivision. The following steps provide a general process for entering subdivided constraint records:
  - a. In the right pane, right-click and select **Insert**. A new record is added to the pane.
  - b. Click the down arrow in the Constraint Column column and select the desired constraint.
  - c. Click the down arrow in the Constr. Type column and select the desired constraint type.
  - d. In the Constraint Limit column, enter the value for the constraint. Note: Percentages are entered as a decimal value between 0 and 1 (for example, 5% is entered as 0.05 not 5).
  - e. If the constraint type is Percentage Above Threshold, enter the threshold value in the Condition Threshold column.
  - f. If the constraint will apply to all years in the optimization period, leave the Scenario Year field blank. Otherwise, right-click the constraint record and select **Propagate Years** in the shortcut menu. The application enters a constraint record for each year in the optimization period (which was set in step 5) as a copy of the record you right-clicked. It also enters the year in the Scenario Year field. You will now need to edit each newly inserted record to reflect the appropriate constraint limit.
  - g. If the constraint will apply to all subdivisions of the constraint (if any), then you are finished with this constraint and can proceed to enter additional constraints as needed. If the constraint limit will vary for the different constraint subdivisions, right-click the constraint record and select **Activate Constraint Subdivisions** in the shortcut menu. The application will then insert a record for each child node shown in the Setup Constraint Subdivisions window with the name of the node shown in the Node Name column. You will now need to edit each newly inserted record to reflect the appropriate constraint limit. After editing each record, you can proceed to enter additional constraints as needed.
13. Once all constraints are configured, you are ready to run the optimization. Right-click the left pane and select **Run Scenario**. The application performs the optimization and then displays the results in the Results tab. The Constr. Results tab will also show the actual constraint values at the end of optimization.

**Note:** You can improve performance of an optimization analysis by experimenting with the values entered in the Number of Nodes in Solution and/or Max Sec for Solver fields. In general, increasing the number of nodes improves the quality of the optimization, but at the cost of increasing the amount of time that the analysis runs. Similarly, increasing the amount of time that the Solver runs will improve the quality of the optimization, but at the cost of lengthier run times.