

RELEASE NOTE

# Taro™

Leading RAM tools for responsible and profitable performance

Version: 5.3.1

Date: June 2017





**Prepared by: DNV GL - Software**

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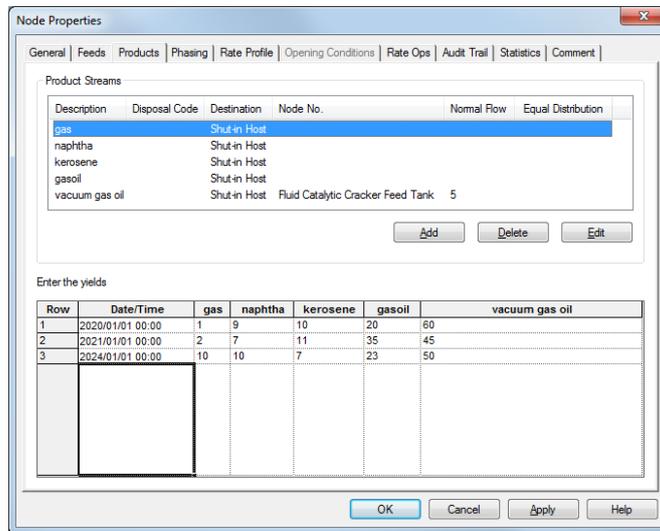
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# 1 WELCOME

Welcome to **Taro 5.3**.

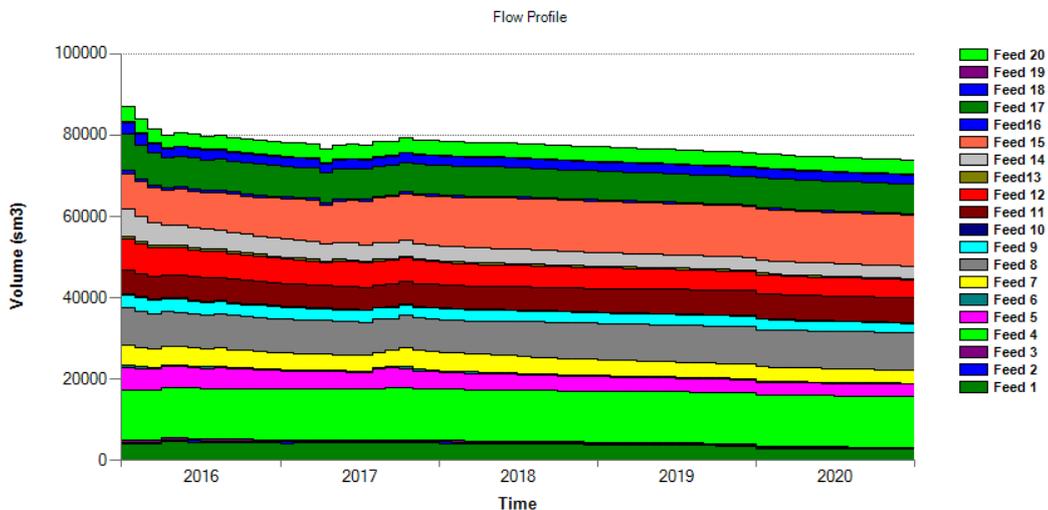
This was a short development project, with only 7 months of duration, where the focus has been to extend the current modelling capabilities to include features coming from Maros, more stability and usability features.

Taro has now the ability to define transient yields for the different process units. In previous versions, the implementation of transient yields included defining multiple units with phase-in and phase-out – this approach increases the size of models and it makes it difficult to perform quality checks. With this new feature, the definition of transient yields is directly performed at the Node property window inside the Products tab.



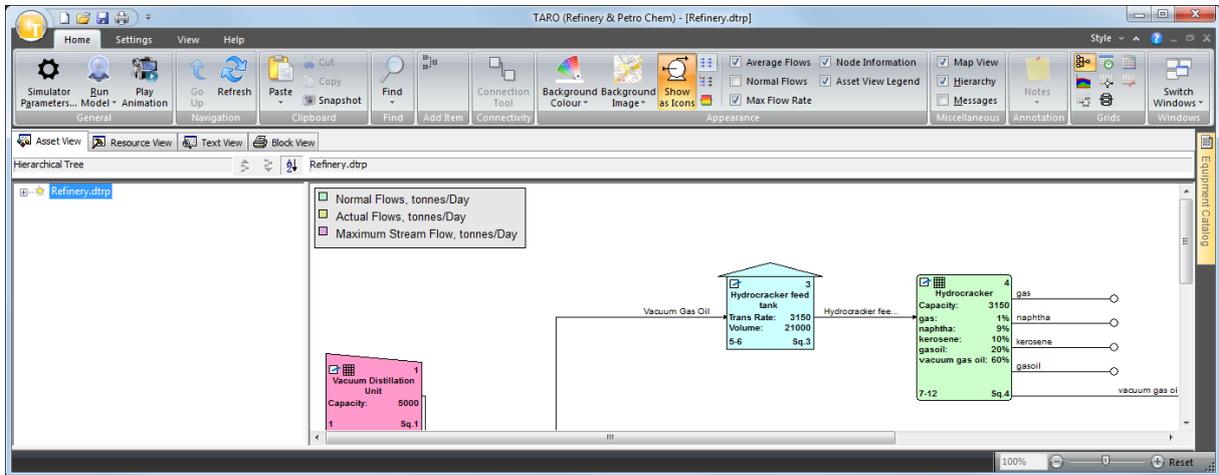
**Figure 1: Transient Yields**

A feed to a plant can be variable in nature. If the variation trends have a predictable nature i.e. a capacity increase over time, a seasonal variation, then they should be modelled defining the profile and the possible variations inside each time-span. The Flow Grid view has been introduced to Taro allowing users to specify flow changes for all feed nodes.



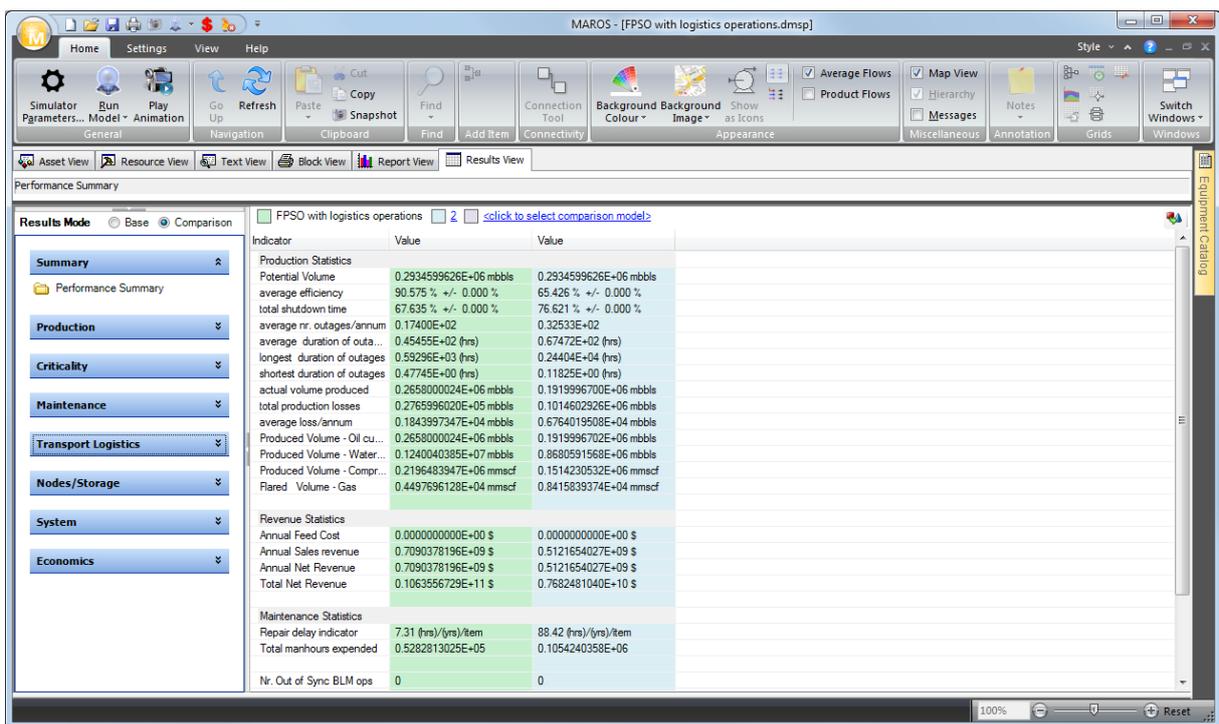
**Figure 2: Flow Grid**

Furthermore, improvements to the interface have been introduced based on customer feedback to the recent change of the Ribbon Tabs. For example, the zoom bar has been moved to the bottom right of the application leaving more space to the Home Tab. Additionally, the Grid button has been removed and a new layout introduced to make it easy to access the different grids.



**Figure 3: New layout for the Home Tab**

A new Comparison View has been added to the Results View application allow users to easily compare results from multiple cases.



**Figure 4: New Comparison Mode at the Results View**

This version extends the concept of Rate Operations to allow a change in the production rate to initiate an independent event. The independent event is triggered once the threshold level and direction are breached; it is important to note that, by default, the event will be repeated sequentially for as long as the threshold is breached.

We hope you enjoy the experience of using Taro 5.3.

Please let us know what you think at [software.support@dnvgl.com](mailto:software.support@dnvgl.com) or sending your feedback directly to [Victor Borges](#).

Your comments, suggestions and requests will help us shape the further evolution and improvement of DNV GL's RAM software tools.

## 2 WHAT'S NEW?

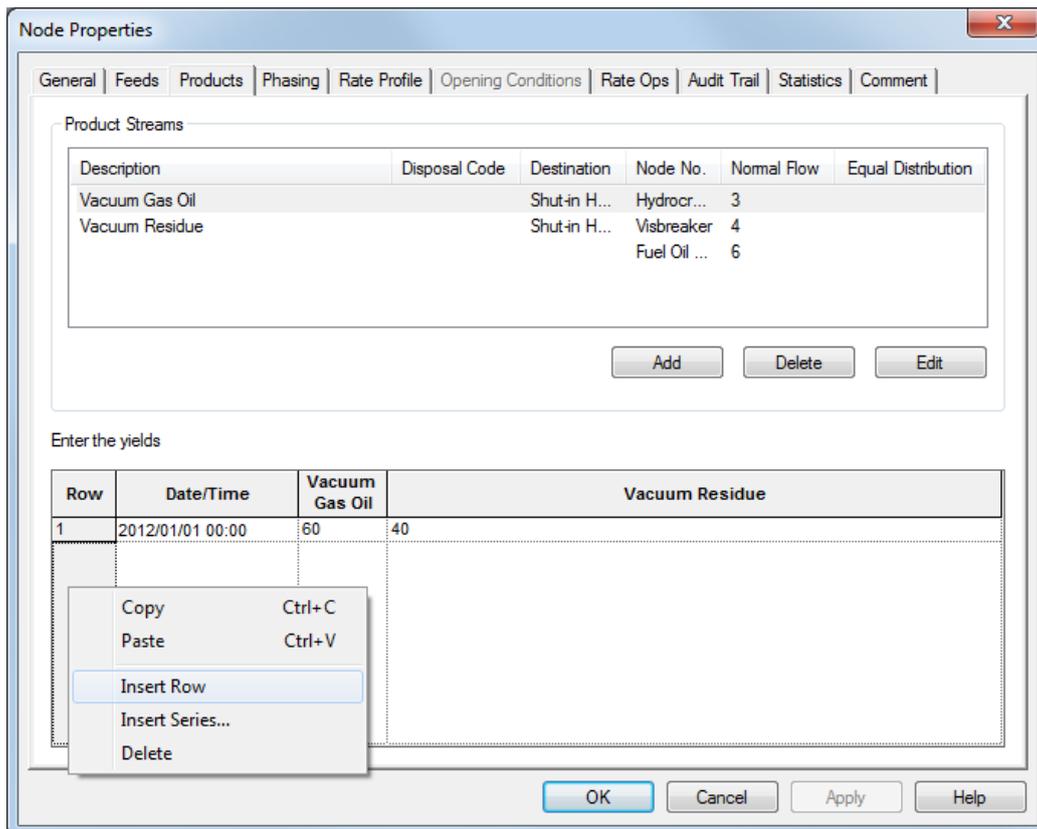
### 2.1 Transient Yields

Different types of crude oil yield a different mix of products. Crude oil types are typically differentiated by their density (measured as API gravity) and their sulphur content. Crude oil with a low API gravity is considered a heavy crude oil and a larger yield of lower-valued products. Therefore, the lower the API of a crude oil, the lower the value it has to a refiner as it will either require more processing. Thus, being able to define transient yields, based on different the delivery of different crude oil types, is an important parameter when simulating the performance of refinery is the ability to.

With the current version, if the user wants to set up a transient yield, there is a need to define multiple units with phase-in and phase-out – this approach increases the size of models and it makes it difficult to perform quality checks.

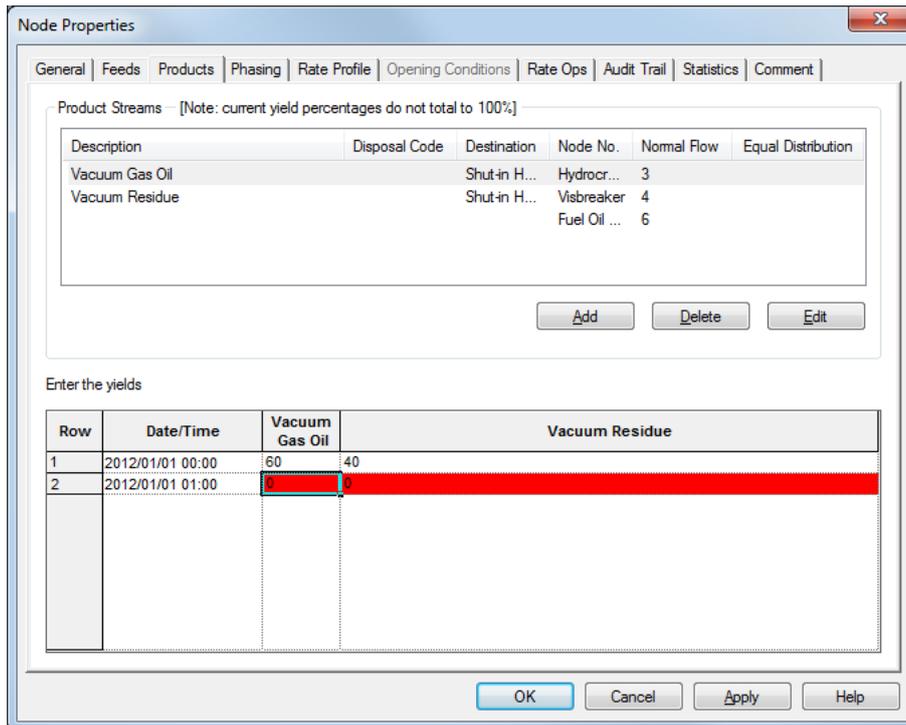
The new Transient Yield feature allows users to set up time-based yields directly at the Node property window inside the Products tab.

The first row of the grid refers to the existing definition of the yields. The selected date is always the first day of the start year.



**Figure 5: Products tab in the Node properties window**

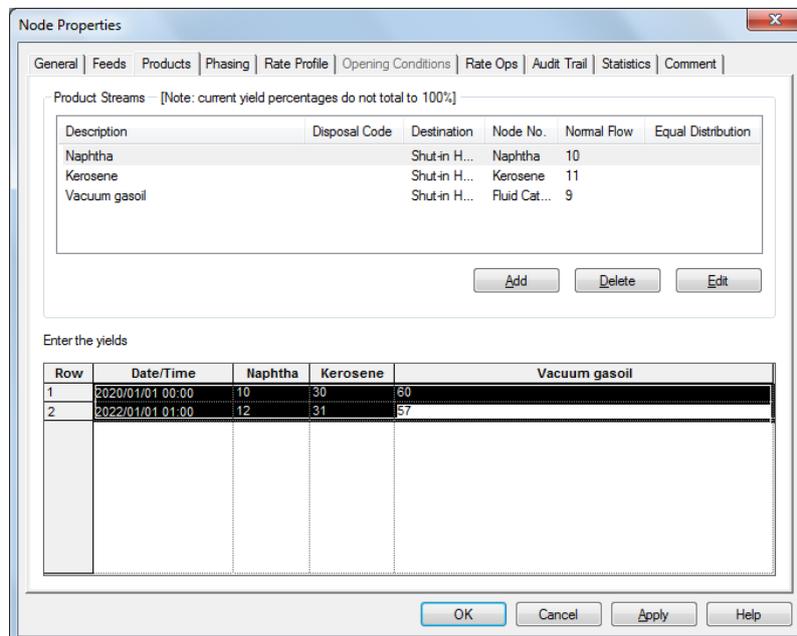
The transient yields grid is validated and the values in the columns with the Product Stream description must always sum to 100%.



**Figure 6: New row has been inserted in the Transient yields grid**

Taking the following example where a different type of crude is expected to be delivered during the second year of production for a refinery – this will make the efficiency of the different units in the plant vary. For example, during the second year, the production engineers expect the Hydrocracker unit to produce 12% of Naphtha, 31% of kerosene and 57% of Vacuum gasoil.

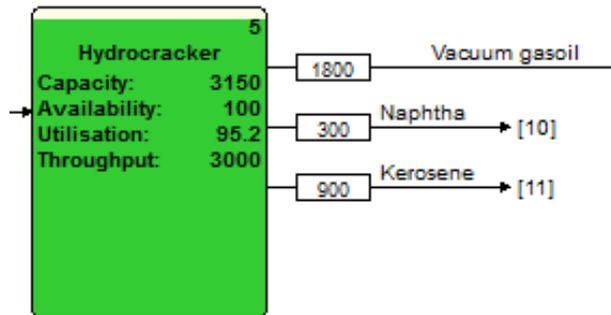
This can be easily defined at the Products tab in the Hydrocracker units:



**Figure 7: Example of the Hydrocracker**

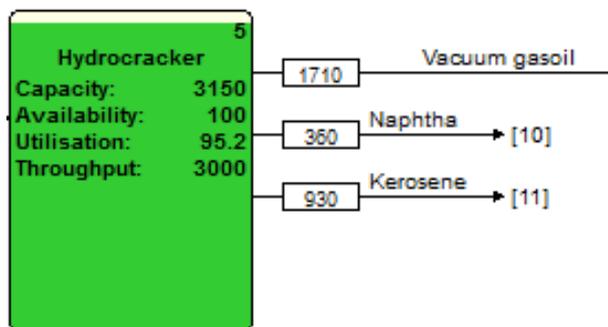
Running the simulation engine will produce the following stages of normal production for the hydrocracker unit. The animation mode shows:

1<sup>st</sup> year)



**Figure 8: Normal production for the Hydrocracker during the first year**

2<sup>nd</sup> year)



**Figure 9: Normal Production for the Hydrocracker during the second year**

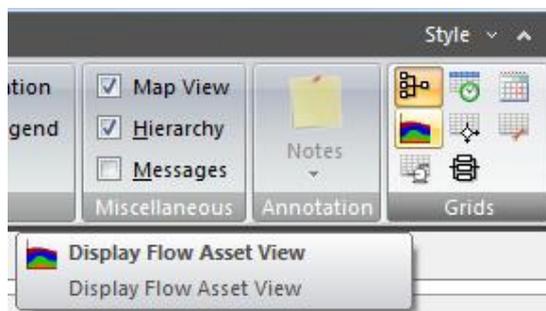
## 2.2 Flow table view

The Flow table view provides a spreadsheet like method of specifying flow changes for all feed nodes. Feed nodes are defined as nodes with no upstream connection.

A feed to a plant can be variable in nature. If the feed variations are the results of unpredictable events, then these variations should be modelled using appropriate failure modes. If the variation trends have a predictable nature i.e. a capacity increase over time, a seasonal variation, then they should be modelled defining the profile and the possible variations inside each time-span.

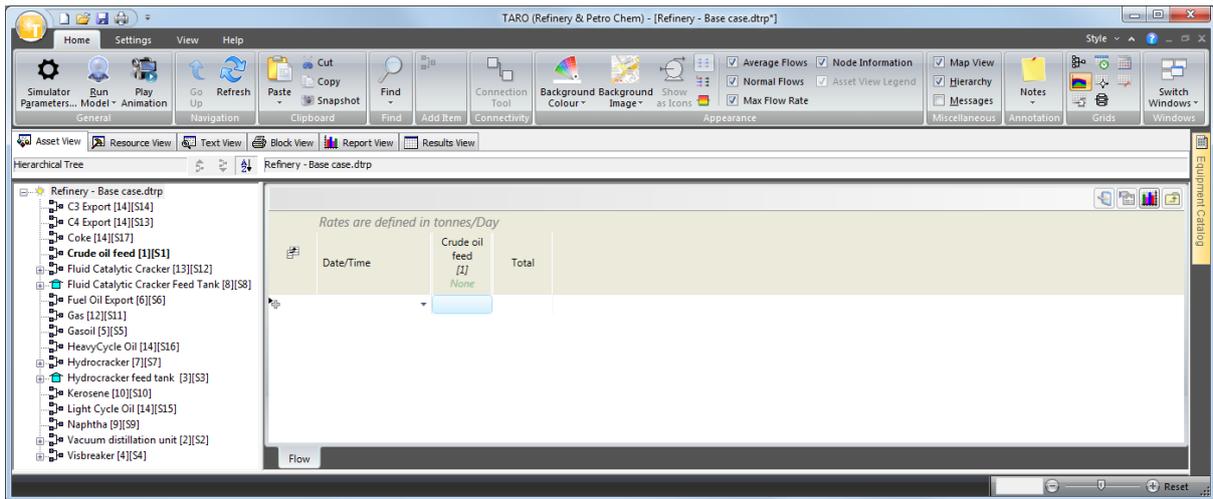
### Configuring the Flow table

To access the Flow Grid, select  from the Grids area as shown below:



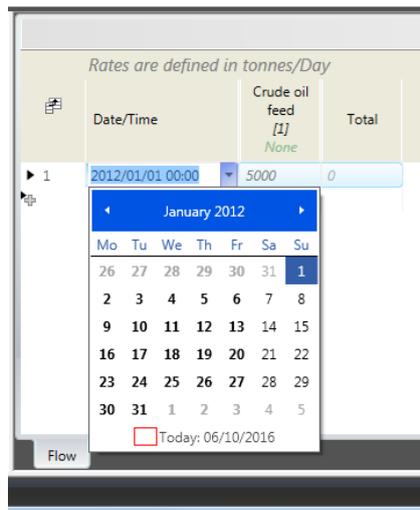
**Figure 10: Flow Table location**

A table of and a spreadsheet like view should appear, as shown below, which has a Date/Time column and a column for each Node. If you wish to return to the previous view just click on the *Flow Grid Button*. Alternatively, select one of the Views using the Grid area of the Home tab.



**Figure 11: Flow table interface**

Clicking on the drop-down icon, as shown in Figure 12, will add a new row which will start at the current year but the user can pick up any date from the calendar window. In the calendar facility, the user can select the year, month and date. If the user decides to type in the dates, please note that the date format is yyyy/mm/dd hh:00 where yyyy is a four-digit year, mm is a two-digit month, dd is two-digit day and hh is a two-digit hour value based on the 24-hour clock. The minute's value is there purely for display purposes and cannot be altered. Also, dates before the start year should not be entered nor should February 29<sup>th</sup> on leap years.

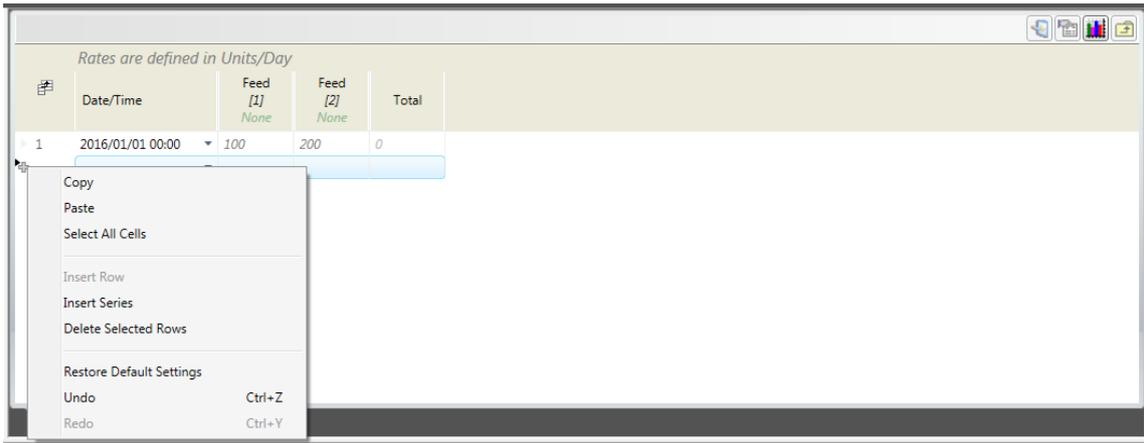


**Figure 12: Method for adding new rows representing flow changes**

A row represents a discrete change to the production rate for all the feed nodes and, initially, all capacity values are set to the node design capacity. This will be displayed in Italic greyed out.

Another method of adding rows to the Flow table view is by right-clicking on the "+" button and selecting from two options:

- Insert Row which will produce a default date which will be at the start of the current year
- Insert Series

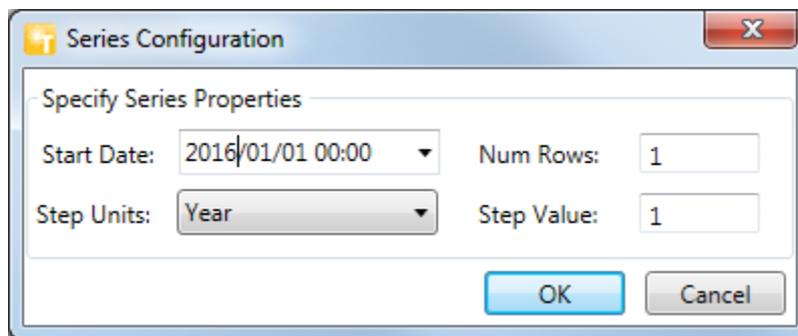


**Figure 13: Clicking on the “+” button will display a dialog with more options**

The series configuration can be used to insert rows where more than one row is required and the rows are equally spaced in time. This facility is useful where, say, the data changes on a yearly or monthly basis.

The process to insert a series of rows to the flow table is described below:

- Open the flow table through the View menu at the top right hand side of the software
- Right-click on the “+” icon - Figure 14
- Select the option to Insert Series Figure 14
- If the option to Insert a Series, another dialog will open, shown at Figure 14

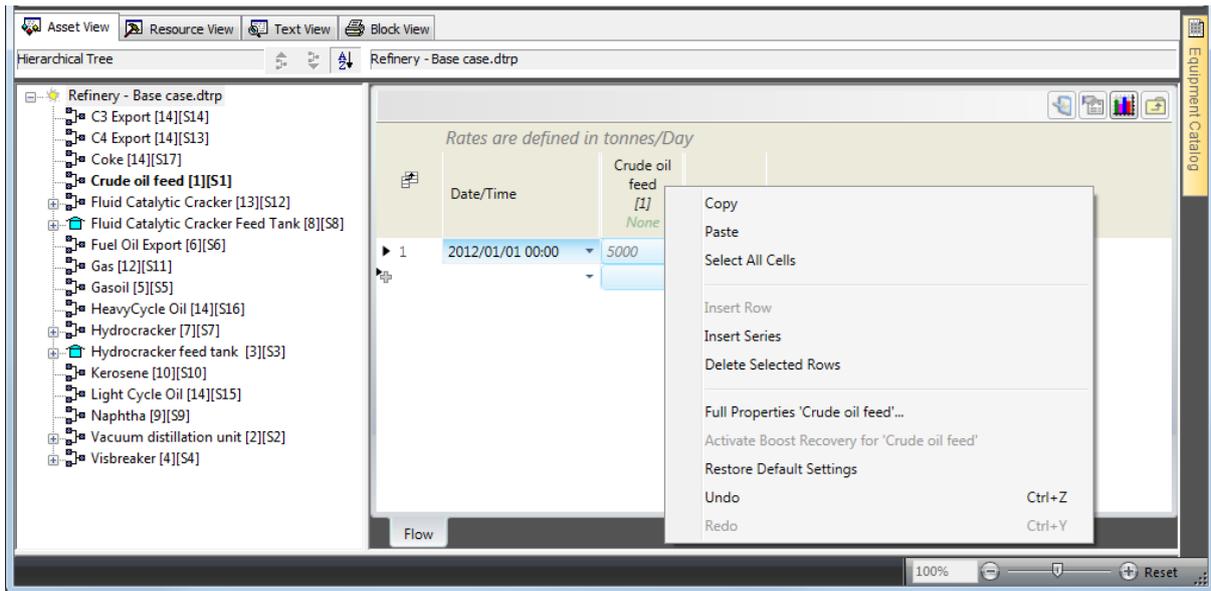


**Figure 14: Inserting Rows and Series and Series configuration window**

To set new flow rates, simply click on each field and enter the appropriate flow rate for this time. The capacity format is by volumetric flow and units are taken from the Simulator Parameters and shown on the top of the Flow grid.

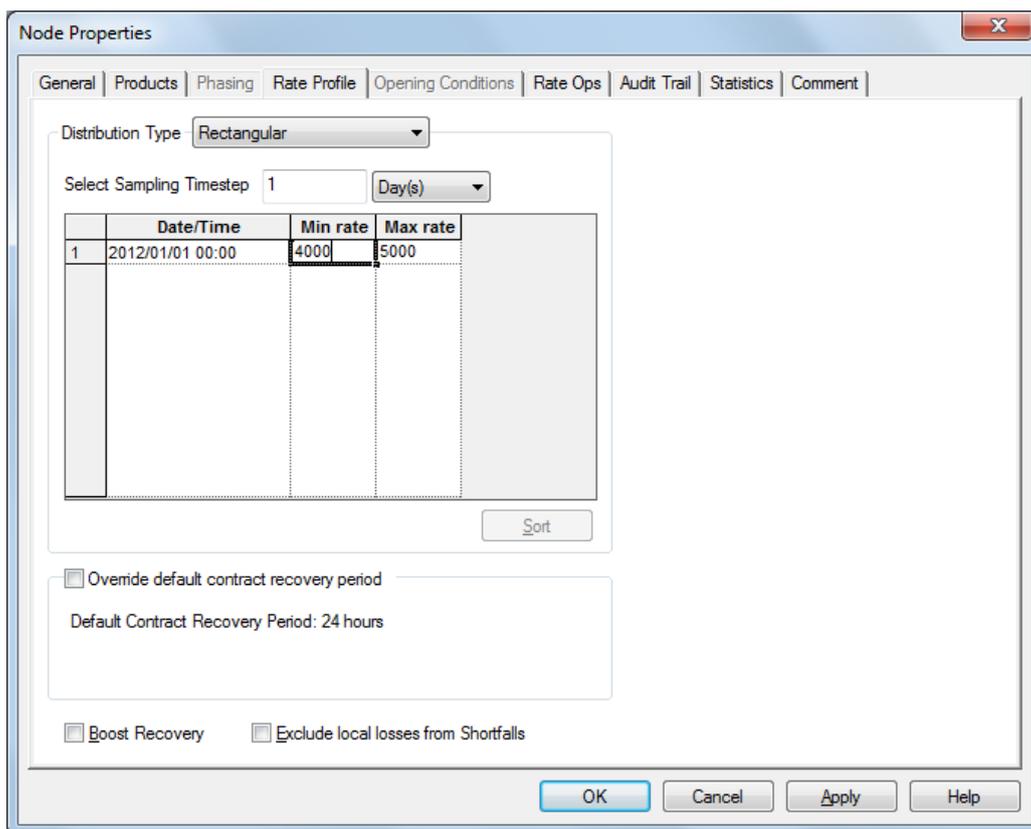
It is important note that the Flow Grid currently allows users to enter Constant rates and visualise all the remaining Rate Profile distributions. To edit the latter, users must access the Rate Profile tab at the Node Property.

The user can easily access the property window by right-clicking on the Node name at the top of the respective column at the Flow Grid and selecting “Full Properties [Node name]”. The reference node will also be selected the node at the Hierarchical tree, as shown below:



**Figure 15: Right-click on the Reference Node at the top of the Flow Grid to access the full node properties**

After selecting the full properties window, the Rate Profile tab is displayed:



**Figure 16: Rate Profile full node properties window**

After defining the distribution and pressing "OK" to the window, the distribution name will be displayed at the Flow Grid with its respective parameters.

The order parameters are displayed in the following order on the grid:

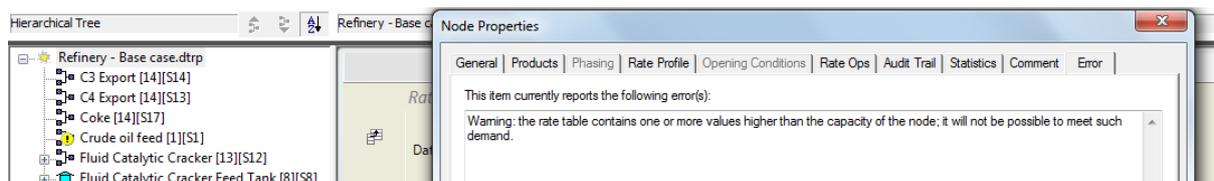
- Normal: Expected Rate and Standard Deviation
- Rectangular: Minimum and Maximum rate

- Triangular: Minimum, Mean and Maximum rate
- Weibull: Characteristic life and Shape Factor
- CDF: displays the distribution name
- Table: displays the table name

## Validation

Any node value that exceeds its capacity, the Node Design capacity, set up at the Node properties, will show a validation problem.

If you right on the Node with the warning sign, the error tab will show the following message:



**Figure 17: Error window for Feed 1 and Process respectively**

This will not prevent the user from running the model.

To fix this the user must either reduce one or more feed node capacities until the error condition disappears. If the capacities are valid then you should increase the Node Design Capacity in the Node showing the error.

## Node ordering in the Flow table

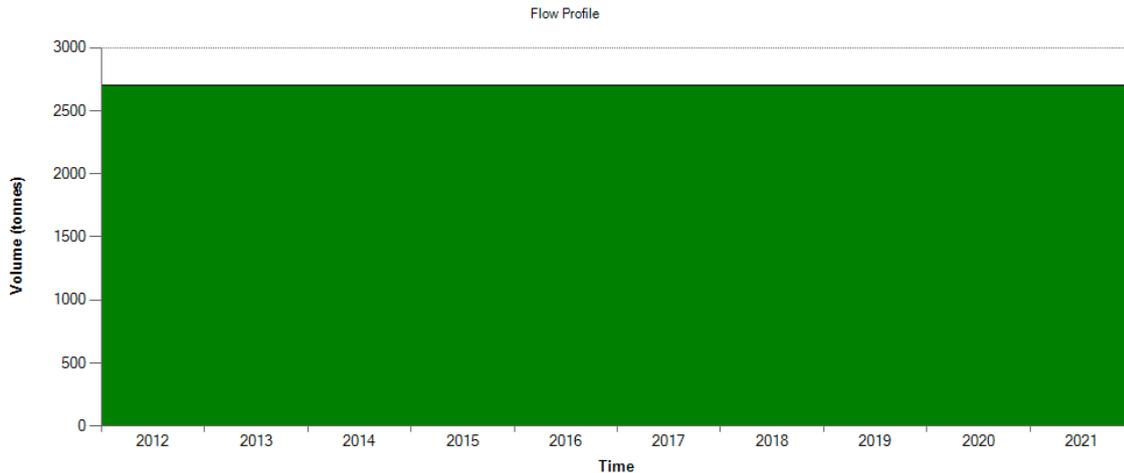
In the Flow table, the nodes are displayed in a specific order (using the Sequence Number method). The nodes are separated into groups with a matching number steps from the source nodes. This ensures that all the source nodes appear as the first columns in the grid table. Within these groupings the node positions are in order of node number with lowest number first.

Where there is more than one upstream path to a source node, the grouping of a node will be dictated by the highest number of steps from any source.

## Viewing production rates entries

Once all the periods and production rates have been entered and checked it is possible to view these in

graphical form. Selecting the graph button  from the top right of the flow table will display all the feed capacities as a stacked bar chart. Contributors to flow can be stacked (area) or unstacked (line) by using the graph property window:



**Figure 18: Stacked Contributors and graphing one or all streams**

### Copying/Pasting Grid Data

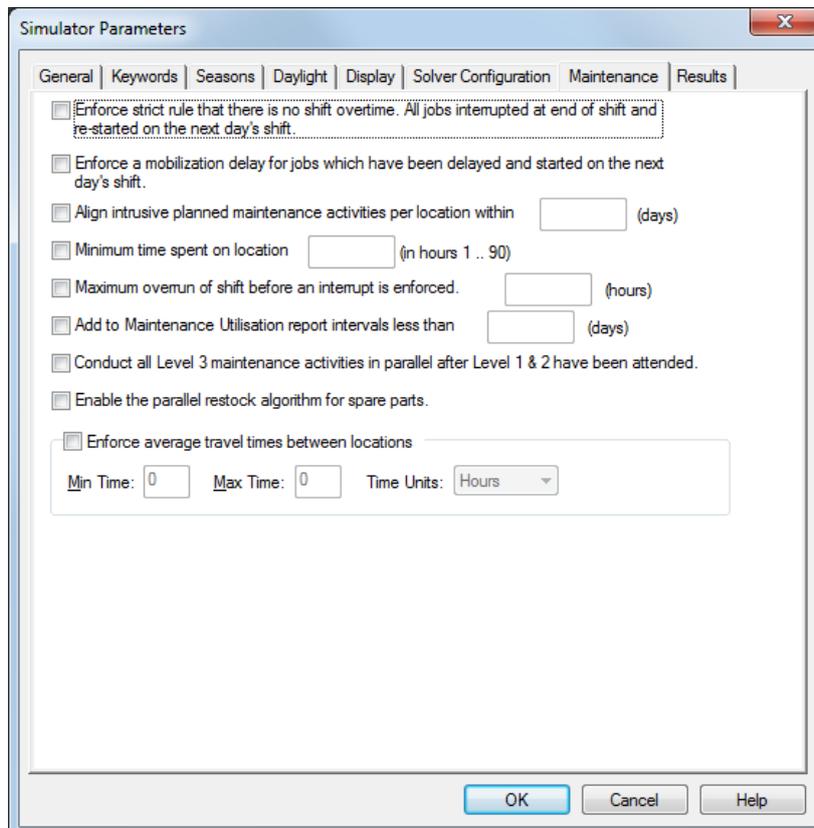
You can use copy and paste to move date and value data to and from the grid. Data can be selected from an individual cell, a group of cells, a row (left-mouse click on one of the left-hand indexes), a column (left-mouse click on one of the headers) or from the whole table (left-mouse click on the empty grey area in the top left corner). Once selected clicking on the Edit>Copy menu item will place that data in the clipboard. This data can then be copied into Excel, manipulated and pasted back in.

Pasting into the Flow table view is simple; just paste the clipboard data into a cell in the Grid and the data in the clipboard will be pasted into a matching column and row block. Since the Flow table view is in a specific format relating to timed node flow value changes there are rules about what may be pasted into the grid from Excel. The following rules apply:

- The copied area must only contain numerical and date data. If dates are included they must only be in the first column.
- If the copied data from Excel includes dates the clipboard data must be pasted into a cell in the first column of the grid, i.e. the date column.
- When pasting data into the product stream table only dates and flow values for source nodes will be accepted on pasting since the intermediate and export node flows are automatically calculated.
- Any data pasted into a disabled column will be ignored. I.e. any data pasted onto intermediate or export nodes in the table.
- If you paste data into the table that does not include dates the data will overwrite the range of data currently present. If there are more rows in the clipboard data than there are below the destination paste cell, then more rows will be added taking an hourly time step as the step between the rows.
- If there is no data in the Flow table, or you wish to append data to the table not overwrite, then the clipboard data should be pasted from Excel into the first empty cell in the date column. As detailed before, the clipboard must have a date column for new rows to be generated.

## 2.3 Maintenance Tab at the Simulator Parameters

The entire list of keywords related to maintenance have been reviewed and a new interface has been designed to make them more accessible and easy to defined:



**Figure 19: New "Maintenance" tab at the Simulation Parameters**

The following section provides a quick description of each option:

- Enforce strict rule that there is no shift overtime. All jobs interrupted at end of shift and re-started on the next day's shift.

**Default:** By default, once a job is started it will be completed by overrunning the shift as required.

**New behaviour:** Enforces a strict rule that there is no shift overtime, all jobs are interrupted at the end of a shift and re-started on the next day's shift.

If the Maintenance profile associated with the repair is of highest priority (i.e. Level 1 (priority 1-5), this keyword is ignored.

- Enforce a mobilization delay for jobs which have been delayed and started on the next day's shift.

**Default:** By default, mobilization delay will not be enforced for jobs which have been delayed and started on the next day's shift and on jobs overrunning into the next day's shift.

**New behaviour:** This option enforces a mobilization delay for jobs which have been delayed and started on the next day's shift and on jobs overrunning into the next day's shift.

- Align intrusive planned maintenance activities per location within [ ] (days)

This option will align all planned maintenance activities forcing them to start at the same day. To define what activities are going to be aligned, the user must input a time range which will align all activities within that time range. Enter the number of days between 1 and 90 days.

Minimum time spent on location  (in hours 1 .. 90)

This option defines the minimum time spent on a job location before the end of a shift, which in turn controls the extent of mobilizations. This is to avoid situations for example where a crew arrive on location and start a job for a few minutes then are forced to return on the next day's shift to complete the task.

Enter the number of days between 1 and 90 hours.

Maximum overrun of shift before an interrupt is enforced.  (hours)

**Default:** By default, once a job is started it will be completed by overrunning the shift(s) as required.

**New behaviour:** This option allows the user to stipulate the maximum allowable shift overrun before an interrupt is enforced. Enter the number of days between 1 and 90 hours.

Add to Maintenance Utilisation report intervals less than  (days)

By default, all mobilization times less than 1day will be included in the man-hours expended, however, this can be overruled by using this keyword permits the user to stipulate an alternative threshold for inclusion.

Conduct all Level 3 maintenance activities in parallel after Level 1 & 2 have been attended.

This option will optimise the maintenance resourcing by taking the maximum number of resources available and repairing all level 3 maintenance tasks in parallel.

Enable the parallel restock algorithm for spare parts.

**Default:** By default, if there is currently a spare restock request in progress, subsequent restock requests for that spare will trigger a new order.

**New behaviour:** If there is currently a spare restock request in progress, subsequent restock requests for that spare will be added to the existing order and be delivered at the same time as the original order.

Enforce average travel times between locations  
Min Time:  Max Time:  Time Units:

This option will enforce travel time between all the locations the maintenance resourcing by taking the maximum number of resources available and repairing all level 3 maintenance tasks in parallel.

## 2.4 New Comparison View

The Comparison View provides the ability to compare the results between different models. Typically, this would involve comparing the results between a base case and its sensitivity scenarios. However, the comparison view is not limited to models that are sensitivity cases – it will try to compare the results from different models when is possible.

Upon completion of the simulation process, the Results View will display two options on the top of the folder view: Base and Comparison.

The Base refers to the Base Case model and will display all the results for the model currently loaded:

Indicator	Value	Additional Info.
<b>Production Statistics</b>		
average efficiency	94.281	% +/- 0.833 %
average efficiency (P10)	95.371	
average efficiency (P50)	94.351	
average efficiency (P90)	93.248	
actual volume produced	0.7936664742E+07	tonne
total production losses	0.4814690609E+06	tonne
average loss/annum	0.4814690609E+05	tonne
<b>Revenue Statistics</b>		
Annual Feed Cost	0.2778052948E+08	\$
Annual Sales revenue	0.1753134580E+09	\$
Annual Net Revenue	0.1475329285E+09	\$
Total Net Revenue	0.1475329285E+10	\$
<b>Miscellaneous</b>		
<b>QA Checks</b>		
Model Validation	Model validation will not be performed when less than 250 simulations are run	
Delta Material Balance	-0.6203539670E-05	tonne
Delta Material Balance %	-0.000	%
Max Material Balance per Life	0.000	%
<b>Model Contents</b>		
Nr. SubNets	17	
Nr. Streams	32	
Nr. Tanks	2	
Nr. Products Monitored	9	
Nr. Unscheduled Elements	24	
Nr. Scheduled Elements	2	

**Figure 20: Result View**

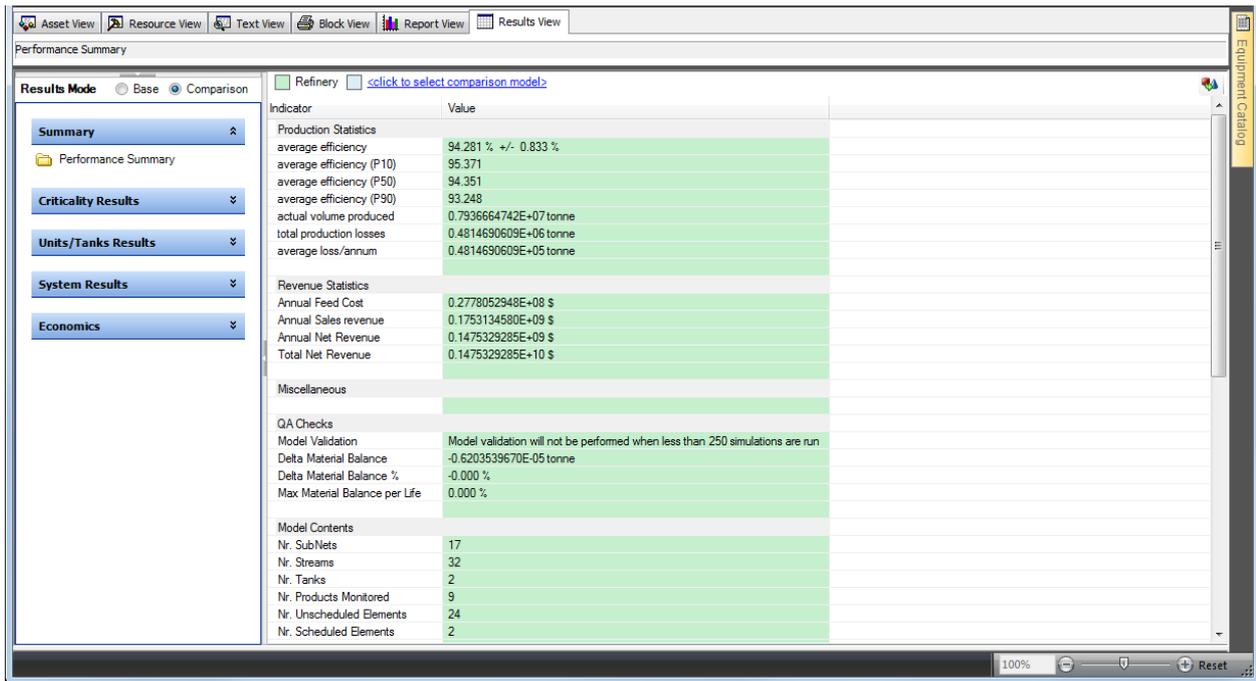
By checking the option "Comparison", the Results View will change its layout. A colourful column will display the results from the Base Case.

Indicator	Value	Additional Info.
<b>Production Statistics</b>		
average efficiency	94.281 % +/- 0.833 %	
average efficiency (P10)	95.371	
average efficiency (P50)	94.351	
average efficiency (P90)	93.248	
actual volume produced	0.7936664742E+07 tonne	
total production losses	0.4814690609E+06 tonne	
average loss/annum	0.4814690609E+05 tonne	
<b>Revenue Statistics</b>		
Annual Feed Cost	0.2778052948E+08 \$	
Annual Sales revenue	0.1753134580E+09 \$	
Annual Net Revenue	0.1475329285E+09 \$	
Total Net Revenue	0.1475329285E+10 \$	
<b>Miscellaneous</b>		
<b>QA Checks</b>		
Model Validation	Model validation will not be performed when less than 250 simulations are run	
Delta Material Balance	-0.6203539670E-05 tonne	
Delta Material Balance %	-0.000 %	
Max Material Balance per Life	0.000 %	
<b>Model Contents</b>		
Nr. SubNets	17	
Nr. Streams	32	
Nr. Tanks	2	
Nr. Products Monitored	9	
Nr. Unscheduled Elements	24	
Nr. Scheduled Elements	2	

**Figure 21: Result View in the Comparison View**

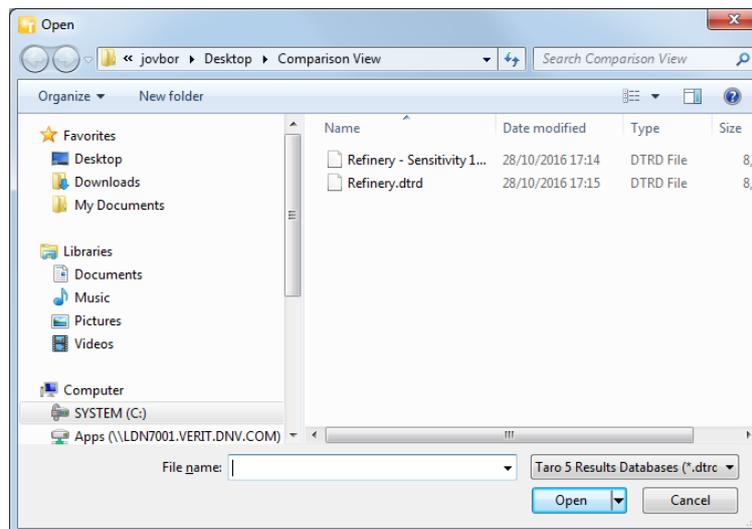
### 2.4.1 Adding a Comparison case

In order to add new cases for comparison, click on the hyperlink to the right of the Base Case legend:



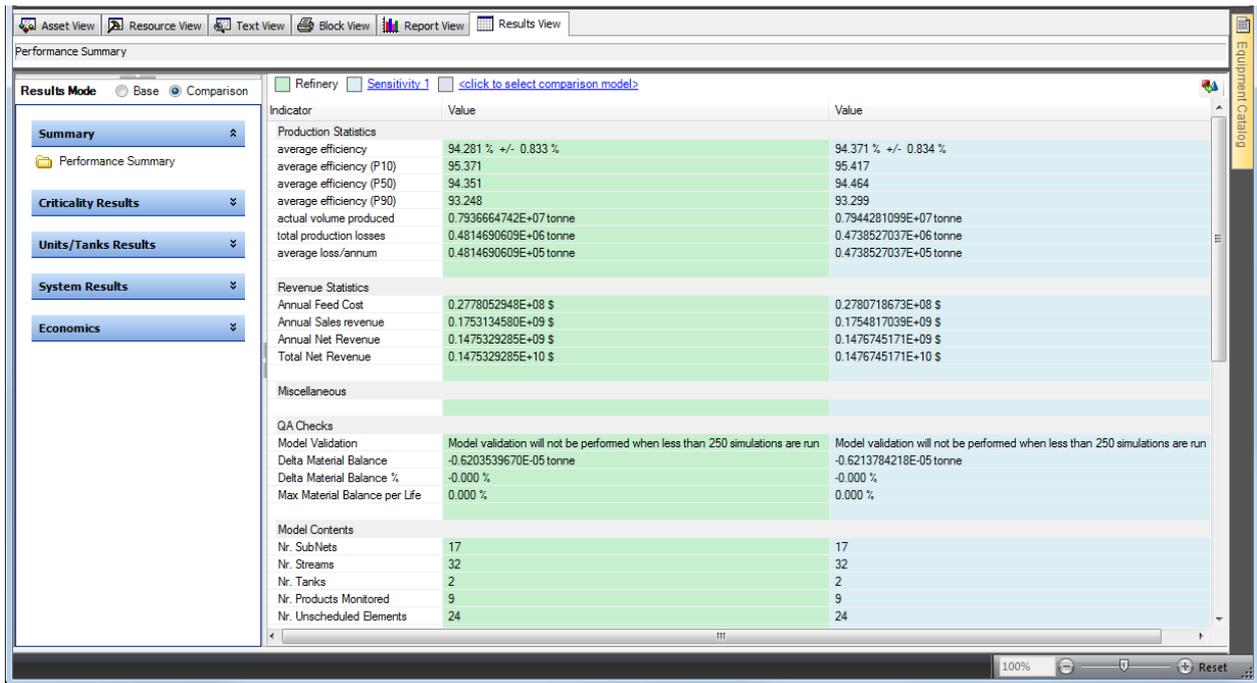
**Figure 22: Result View in the Comparison View**

This will prompt another window that allows the user to select a Results Database (e.g. file extension dmsd for Maros and dtrd for Taro):



**Figure 23: Selecting Results Databases**

After selecting the Results Database and clicking on Open, the new result set will be added to the Comparison View. A colour coding legend will separate the base case from the sensitivity case. The sensitivity case will take the Sensitivity Set name and it will show the results for the modified model. If the model name is an extension of the base case's name, the Comparison View will display only the extension e.g. Base Case = **Refinery.dtrd** and Sensitivity Case = **Refinery - Sensitivity 1.dtrd**; the display will show: Base Case = **Refinery** and Sensitivity Case = **Sensitivity 1**.



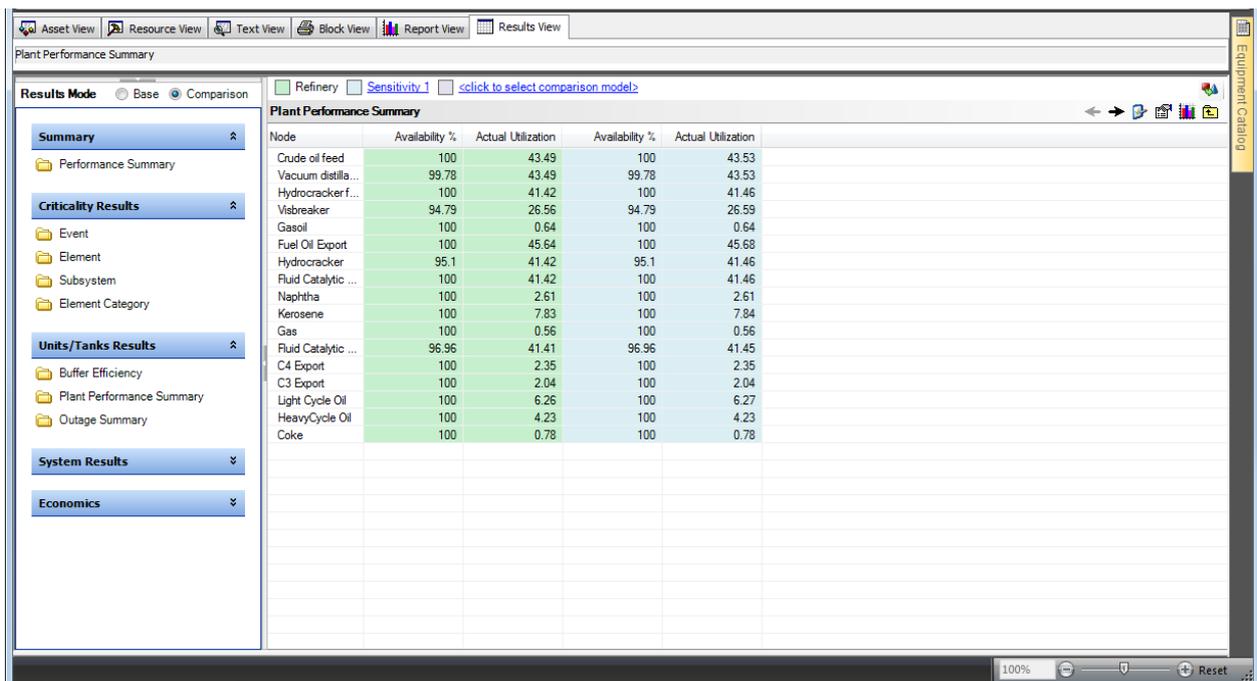
**Figure 24: Example of Base case and Sensitivity case side-by-side in the Comparison View**

To replace an existing comparison model, click on the model to be replaced and the window will be shown again.

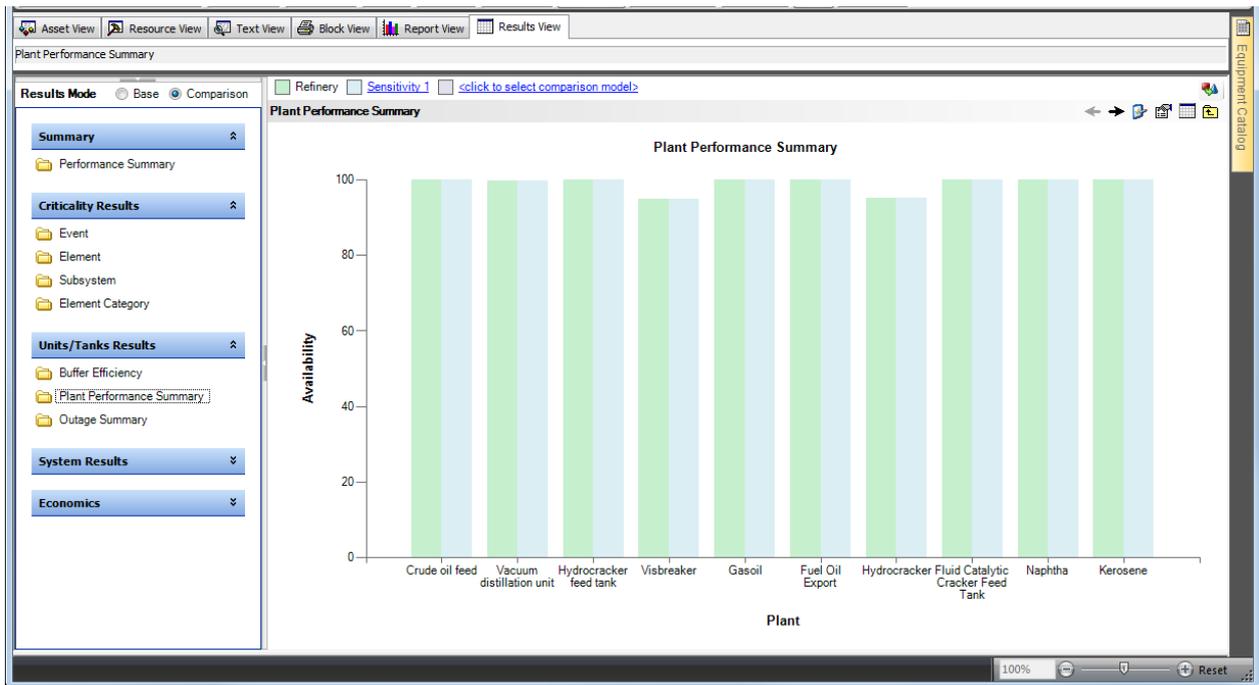
To add more sensitivity cases to the Comparison View, simply click on the hyperlink again and select another Results Database. The results of up to four models can be displayed at the same time – one base case and three sensitivity case.

### 2.4.2 Results display

All the results comparisons are shown in the tabular format. In addition, many of the results can be displayed as graphs benefiting the users greatly in a more user-friendly results comparison.

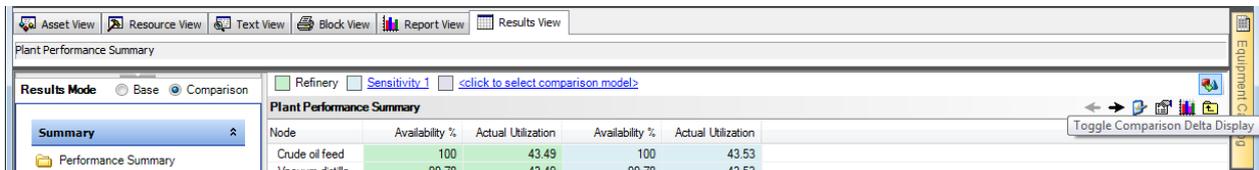


**Figure 25: Similar options to display the results are also available for the Comparison View**

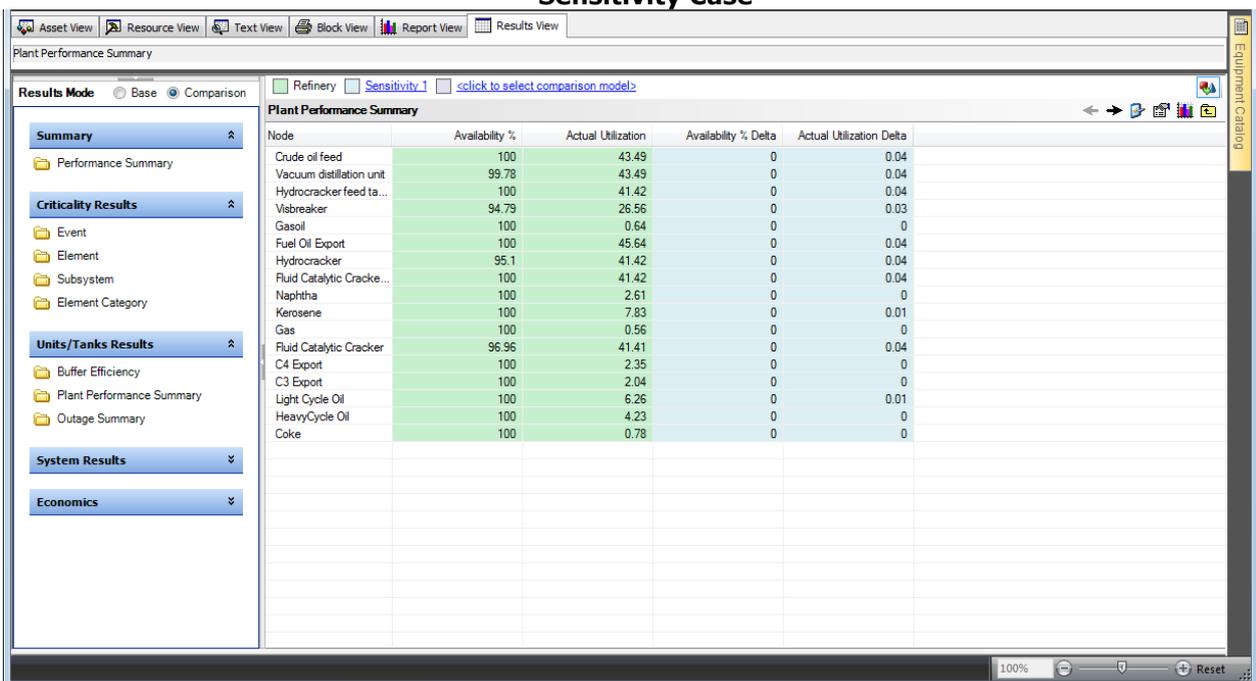


**Figure 26: Graphical display of the Criticality graph**

Another useful feature is the ability to display the delta between the different KPIs. By clicking on the top right of the screen will show



**Figure 27: Top-right button allows users to display the delta between Base Case and Sensitivity Case**



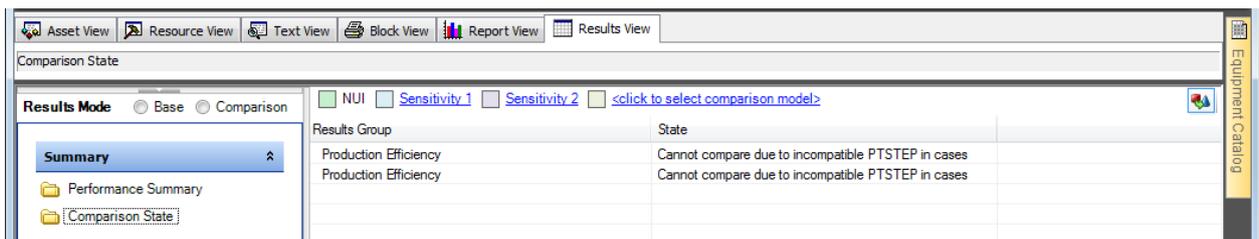
**Figure 28: Comparison View showing delta between cases**

This will display the delta between the Comparison case and the base case i.e. Potential Volume from Refinery.dtrd compared to Sensitivity 1.dtrd.

The number of results folder available will depend on the features defined for the model. Currently, the Comparison view handles the following KPIs:

- Event Criticality
- Element Criticality
- Subsystem Criticality
- Element Type Criticality
- Availability
- Plant Performance Summary
- Buffer Efficiency
- Bulk Transport Group Utilization
- Performance Signature
- Production Efficiency
- Resource Utilization
- Consumption of Spares
- Outage Report
- Contract Losses
- Net Present Value

In case there is some incompatibility when comparing the results, a Comparison State table will be displayed as shown below:

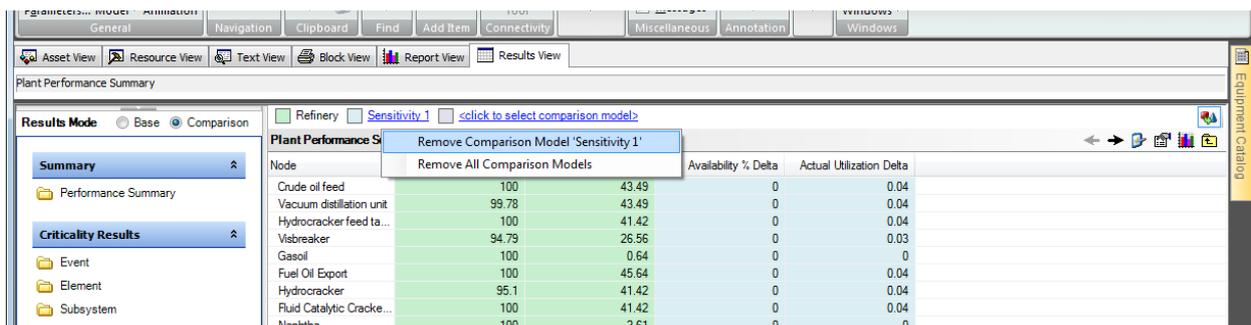


**Figure 29: Comparison State provides information on possible incompatibility**

### 2.4.3 Removing a Comparison case

After comparing results, it is important to remove the all the results databases from the Comparison View. If a results database is not removed from the Comparison View, the model is locked and the application will prevent the users from editing it.

In order to remove a single case from the Comparison View, right-click on the hyperlink with the sensitivity case name and select "**Remove Comparison Model "name"**", as shown below:



**Figure 30: Right-click on the Sensitivity Name to Remove the comparison model**

In order to remove all the results databases – select the option to “Remove All Comparison Models”.

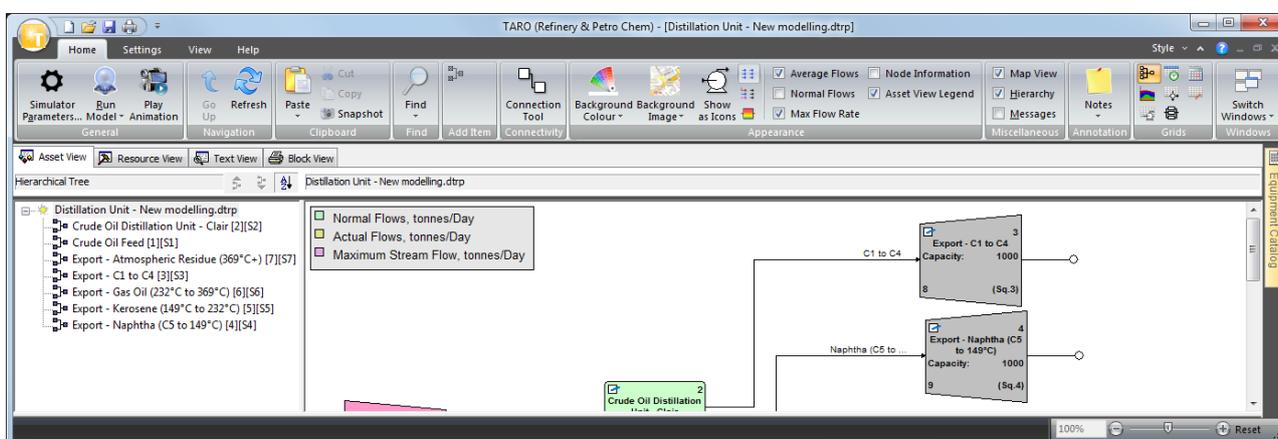
## 2.5 Running models from a server

Prior to Taro 5.3 a project model would be run directly from a server. If the network was poor or the server was slow this would not normally slow down the simulation time but could slow down the results generation time.

In Taro 5.3 all results processing is now done on the local computers “temporary” folder. Once processing is complete the final results files are copied back to the network directory. For slow networks this should show a major improvement in the time taken to generate results.

## 2.6 Improvements to the Interface

The picture below shows the Home Tab in Maros with a working model loaded.



**Figure 31: Taro user-interface**

You will notice the following improvements:

**Zoom Bar:** has been moved to the bottom right of the application to allow for more space at the Home tab



**Figure 32: Zoom Bar**

The Grids button has been removed allowing users to easily access the seven grids available:



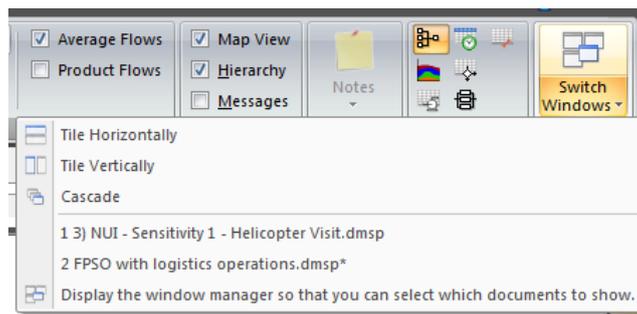
**Figure 33: Grids Area in the Home Tab**

The same lay-out has been introduced to the Add Item area:



**Figure 34: Add Item in the Home Tab**

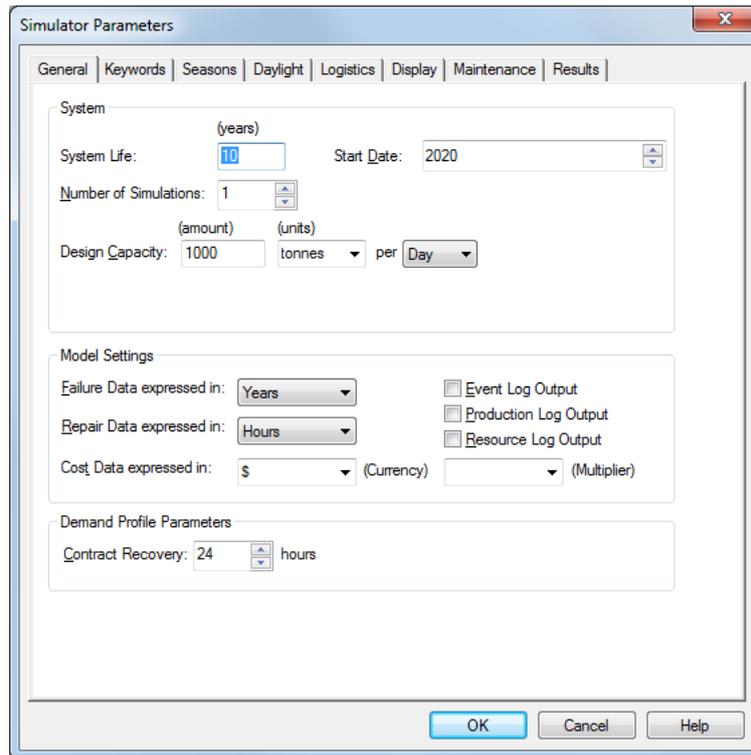
The "Switch Windows" button has been moved from the Views tab to the Home Tab:



**Figure 35: Switch Windows in the Home Tab**

## 2.7 Minor usability enhancements

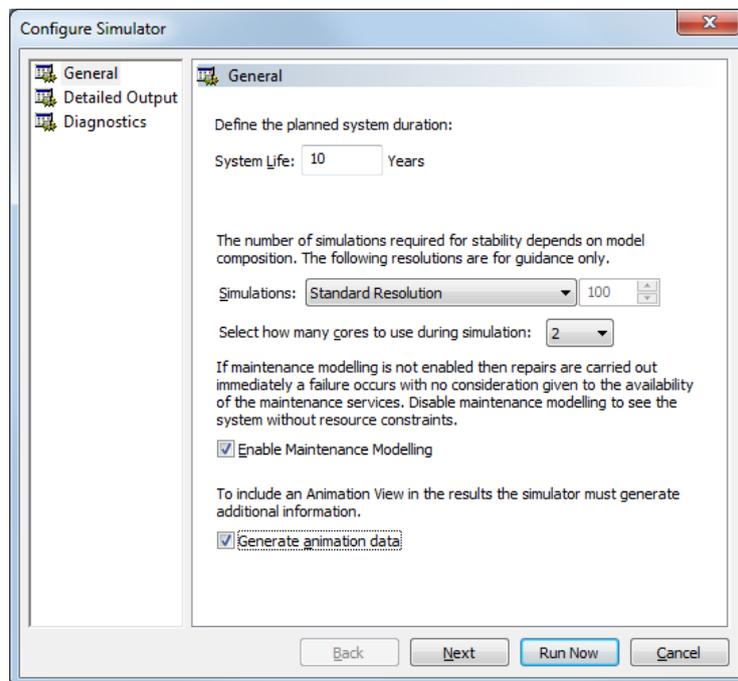
The Simulation Parameters have been changed to align with the reports and a few pre-defined parameters have been added:



**Figure 36: Simulation Parameters**

The Operations log has been renamed to align with the actual log name – Event log output. The Cost data is now automatically defined to dollars to ease the process of defining lifecycle cost studies.

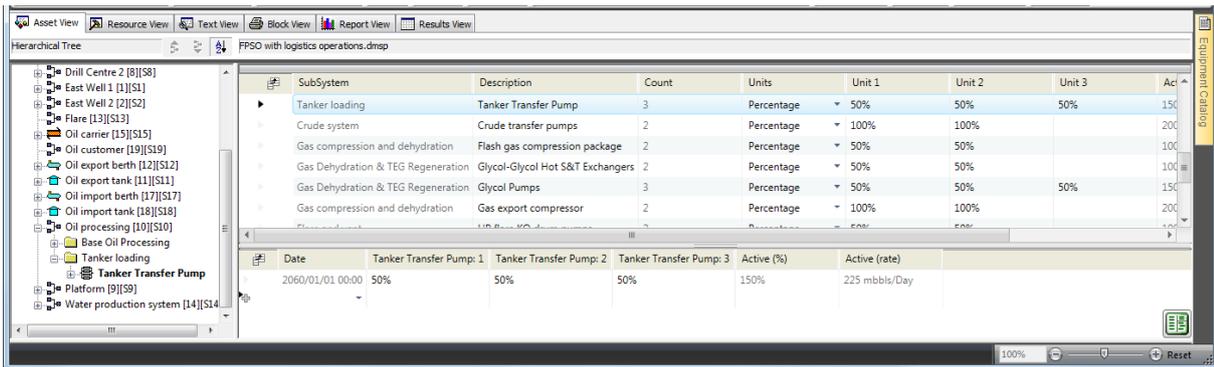
Many users utilise the animation mode to perform quality checks to the model. In order remove one step in the process of getting the animation data, the box "Generate Animation data" at the Configure Simulator window is now automatically checked.



**Figure 37: Configure Simulator**

The batch run functionality has been extended to provide more information in case a model shows a fatal error throughout the simulation process.

The Transient area of the Parallel Grid now displays the name of the parallel unit:



**Figure 38: Transient area of Parallel Block Grid**

Please continue to suggest changes to the interface that facilitates your operation of the model.

### 3 MOVING TO TARO 5.3

#### 3.1 Converting models from generation 4 to generation 5

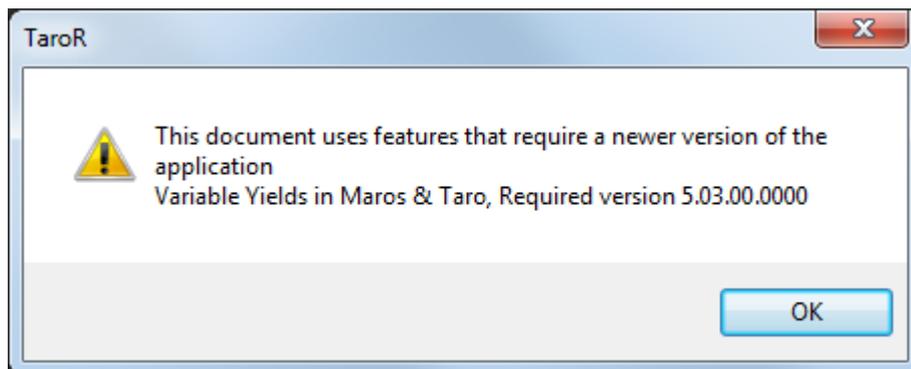
Users do not need to go through a conversion process to load existing models in Taro 5.3. When working with Taro 4 models, users can simply open an existing model in version 5.3 and re-run the application to see the results in the new format.

Taro 5.3 will always create a backup version of the Taro 5 model with the extension jtrp4 at completion of the conversion process.

#### 3.2 Forward compatibility in the new platform: Taro 5

Forward compatibility is also available for Taro.

If a model is saved in newer version, users can open in an older version if the model contains no newer features. For example, if a Taro 5.3 model is saved with transient yields then it will not open in Taro 5.2. The following message will be displayed when trying to load the model in Taro 5.2:



If that feature is removed and the model is saved, then it will load into Taro 5.2.

#### 3.3 Change of file format

The file extension has been changed in the new platform Taro 5 to avoid confusion with version 4.x files.

The new file formats are:

**Table 1: File formats in Taro 4 and Taro 5.3**

Application	Document file extension	Results file extension
Old file format: Taro 4	.jtrp	.jtrr

## 4 FEEDBACK

Feedback is essential for us to keep improving the user-interface and areas of particular interests regarding modelling assets and production scenarios. Please let us know of possible gaps that affect what you are or will be modelling. An important point is that you shouldn't ignore minor issues, tell us about them (we don't always know).

It is important to get your team together and try to provide a wish list where you address the modelling challenges that you, as a company, will be facing soon.

We won't be able to do everything but we will prioritise based on the feedback. With this feedback our aim is to provide the most comprehensive solution for Oil and Gas RAM analysis in the market.

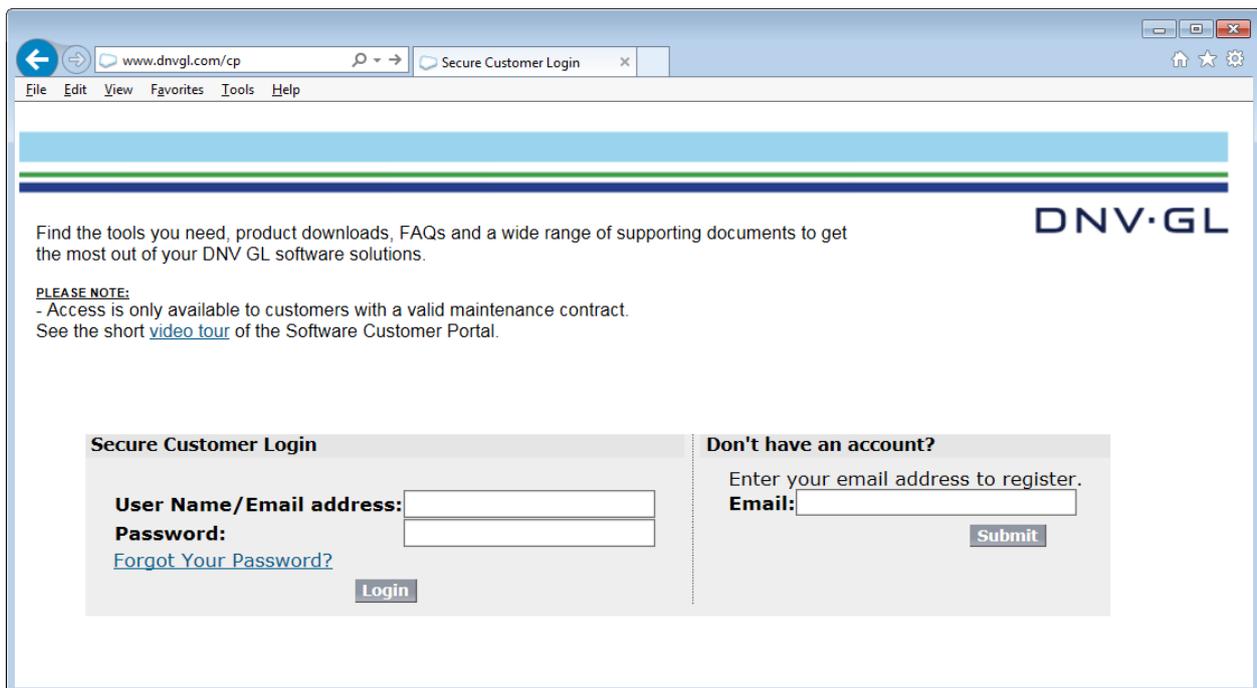
## 5 HOW TO UPGRADE

This section is intended to give general information regarding downloading, installing and licensing Taro 5.3.

### 5.1 Downloading the installation package

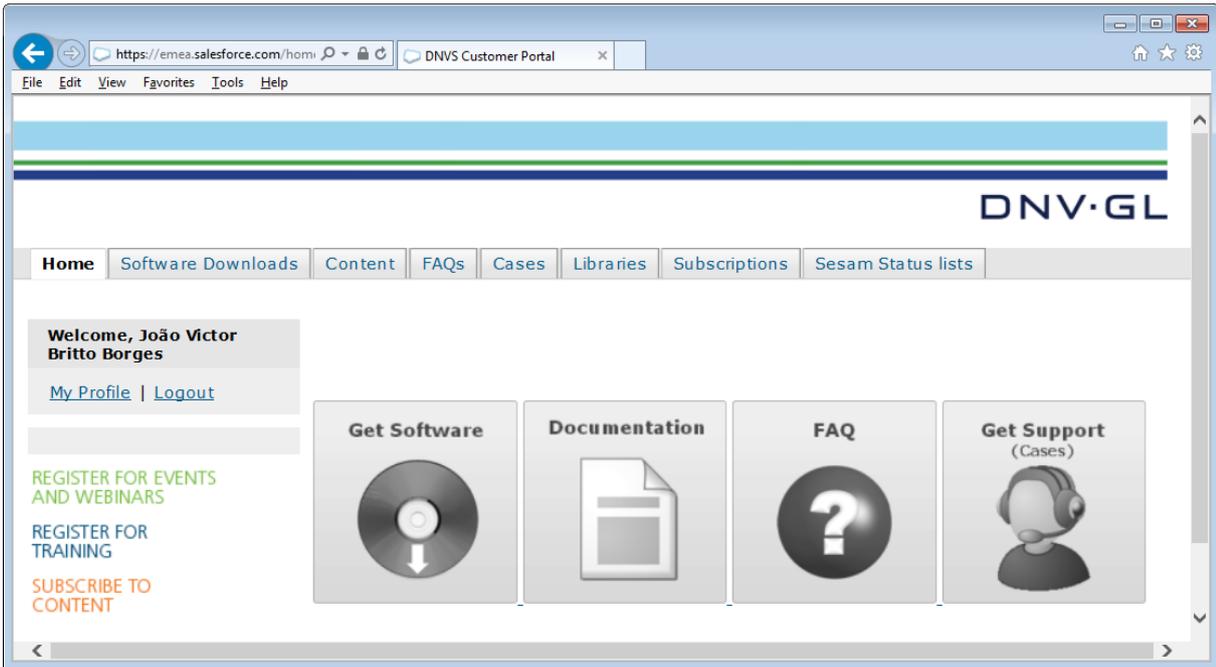
All DNV GL RAM products can be downloaded via the DNV GL Software's Customer Portal. In order to access the Customer Portal, please use the link below to log into the Customer Portal:

[www.dnvgl.com/cp](http://www.dnvgl.com/cp)



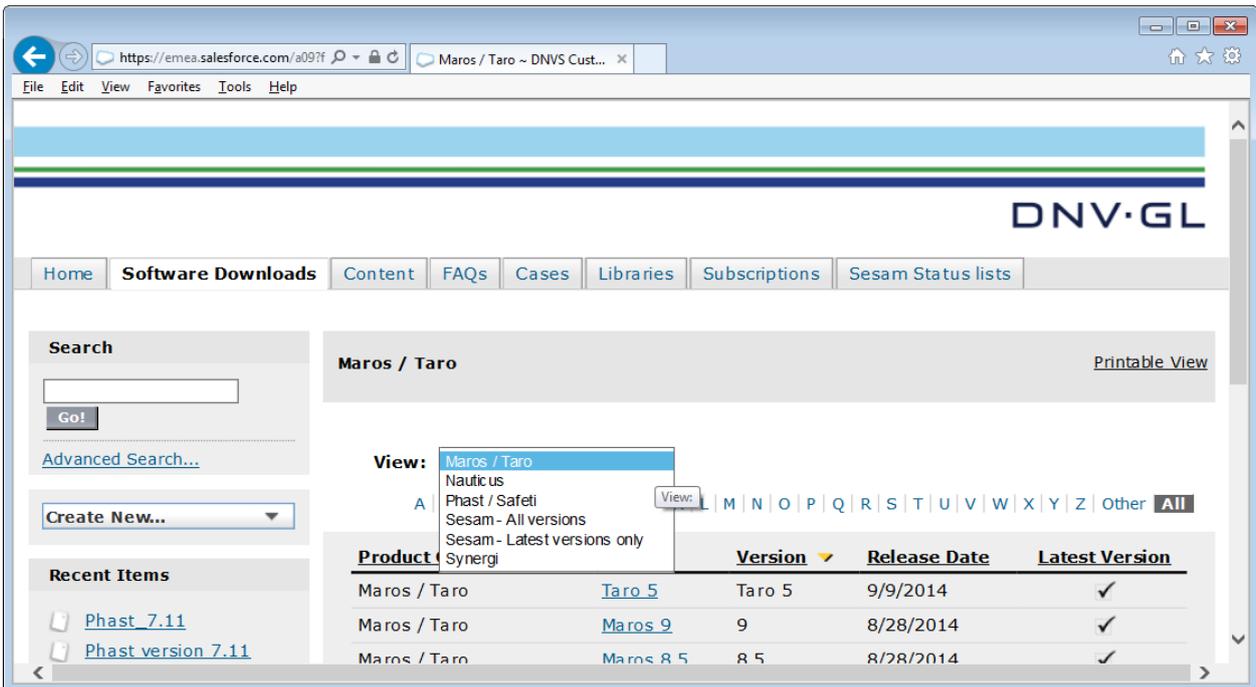
**Figure 39 - DNV GL Software customer portal**

After logging in to the Customer Portal, select the option "Get Software", as shown below:



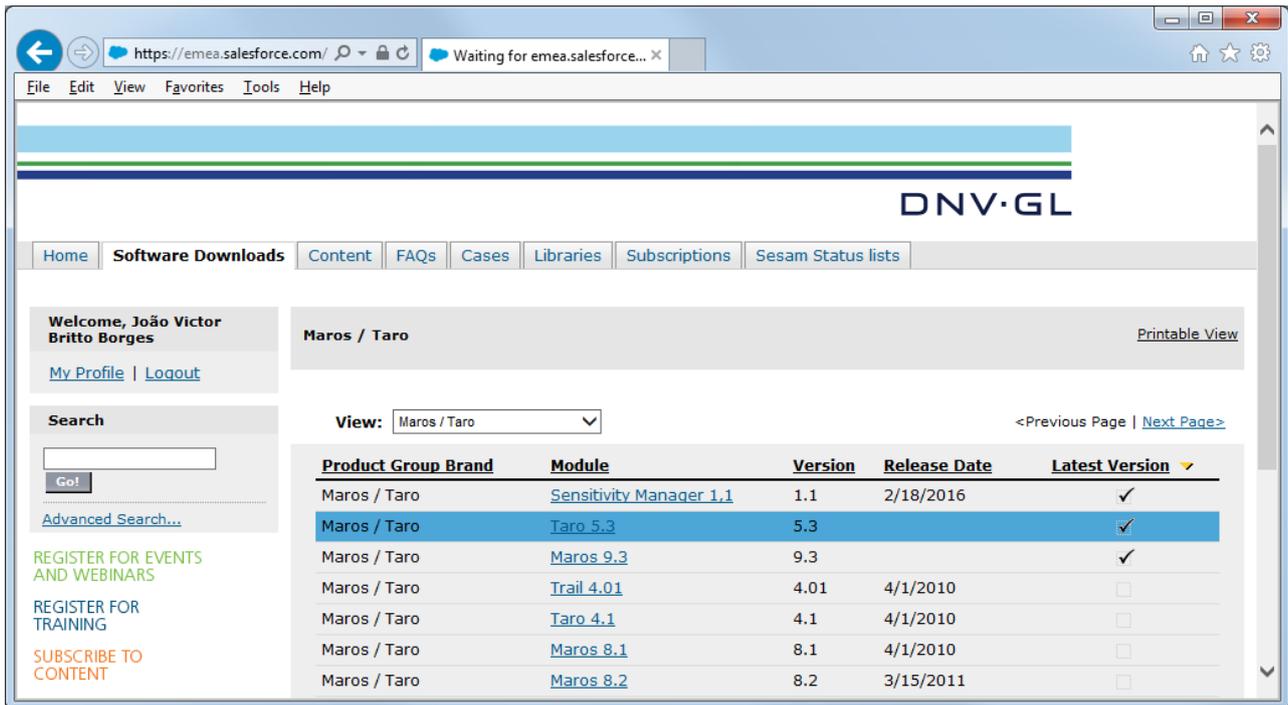
**Figure 40 - Home tab of customer portal**

By clicking Get Software you are taken to the Software Downloads Tab. Click Select Maros/Taro Library from the View dropdown list as shown in Figure 41.

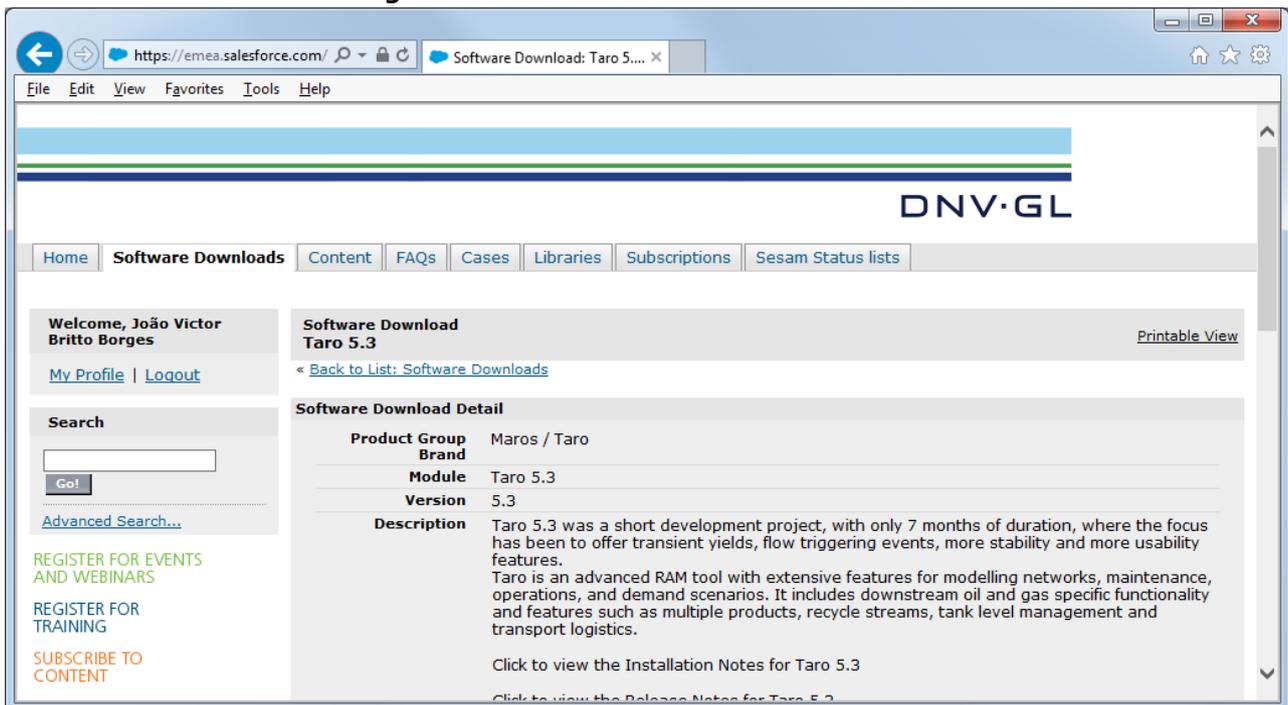


**Figure 41 - View dropdown list**

Taro 5.3 will be listed at the top and marked as "Latest Version".



**Figure 42: Taro 5.3 at the Customer Portal**



**Figure 43: Taro 5.3 download page at the Customer Portal**

Click the “Download” button to download the Taro 5.3 installation files.

## 5.2 Taro 5.3 Installation Process

The Taro 5.3 installation process will not override the existing version of Taro 4 but it will override the existing Taro 5.2 installation. You can therefore keep Taro 4 and 5.3 of Taro installed.

Once the download is complete, you should:

1. Check if you have windows administrator rights.

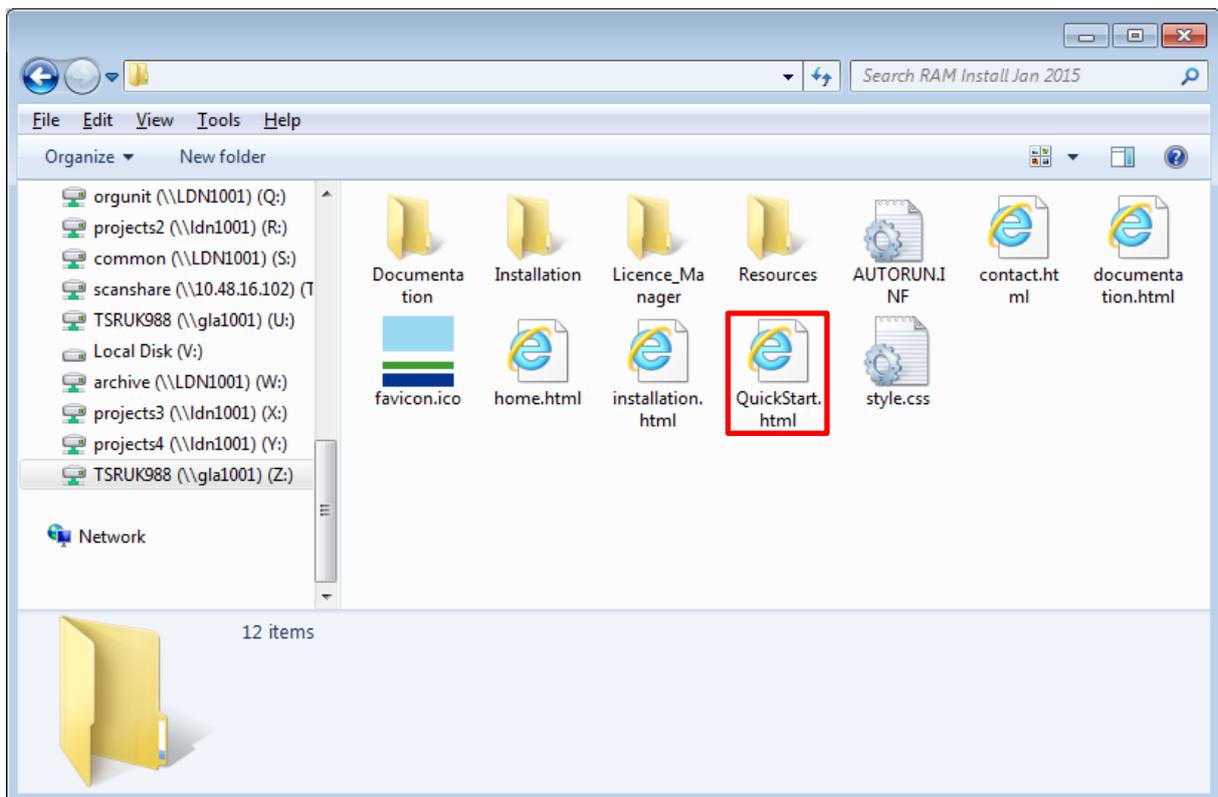
## 2. Extracting and running the installation package

### Check if you have windows administrator rights

In order to install the program, you must have administration rights for the computer. Contact your System Administrator to check whether you have administration rights, or to obtain these rights.

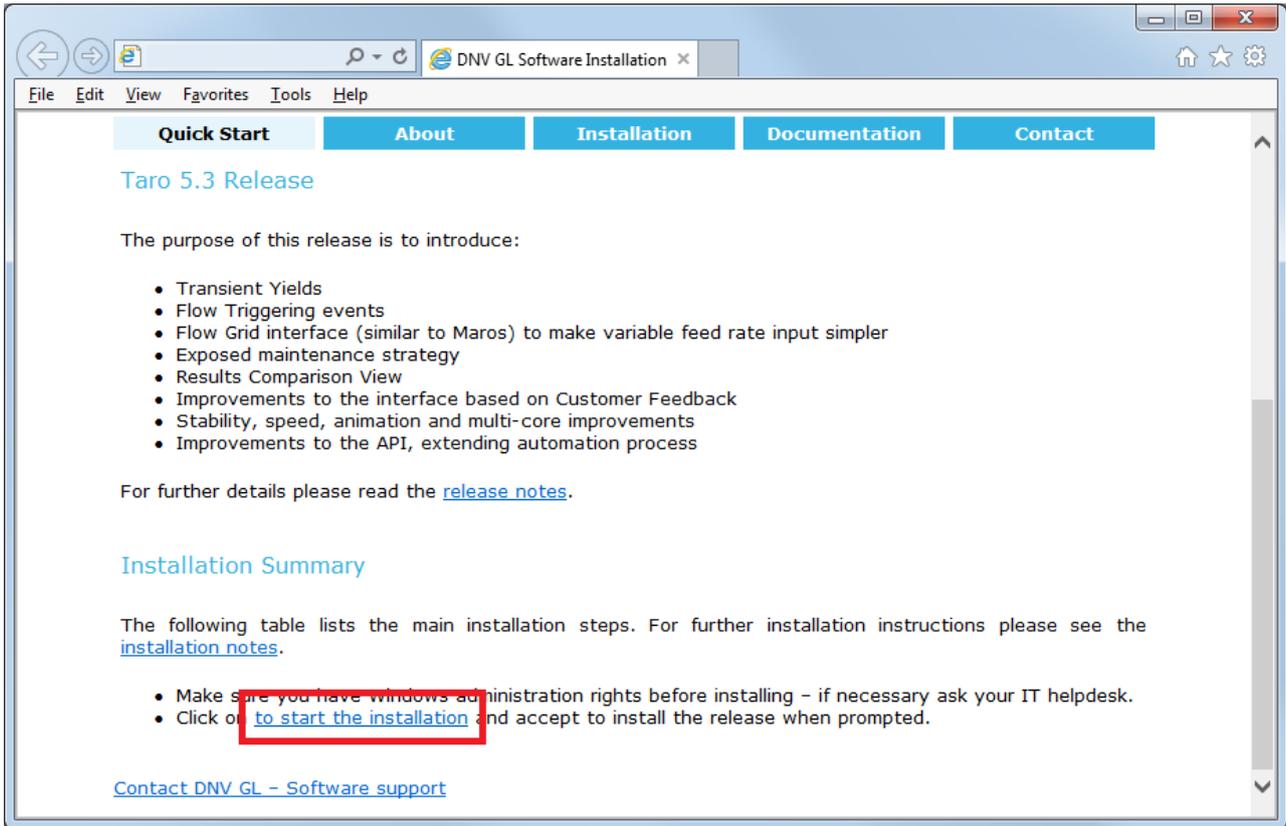
### Extracting and running the installation package

Unzip the content from the zip file to your local hard drive and click on the Quickstart.html as shown in picture below. Please do not try to run the Quickstart.html file from within the Zip file before the files are uncompressed as this may cause your installation to fail.



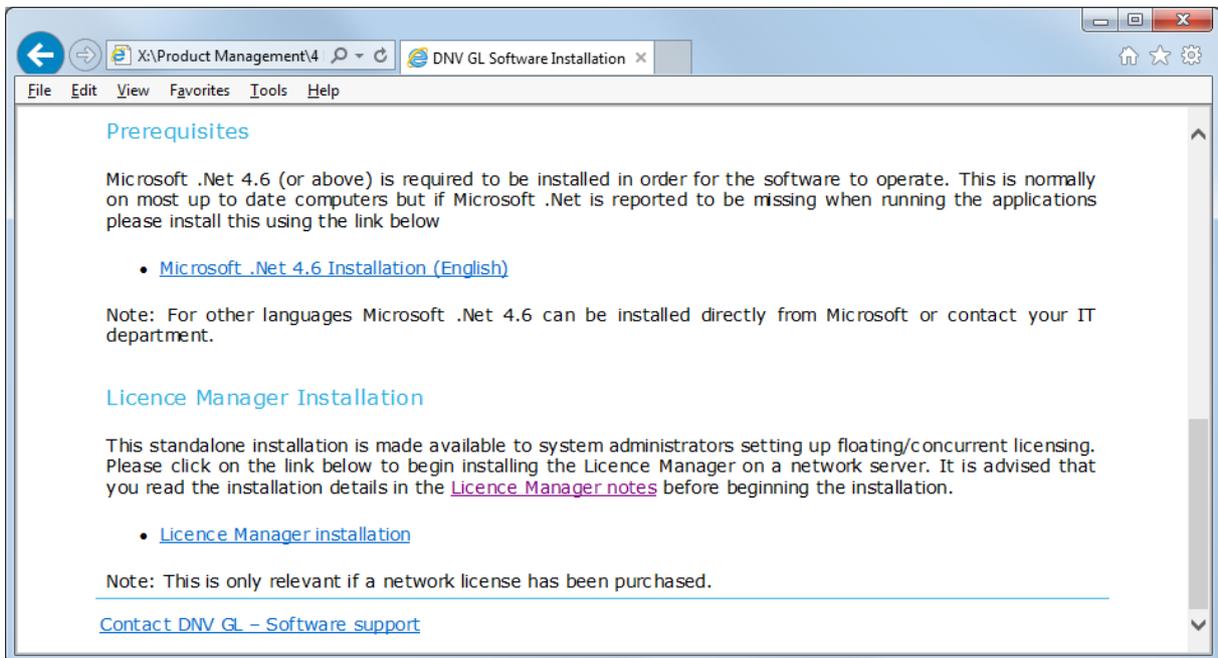
**Figure 44 - Quickstart.html**

This will prompt your default browser to open. Simply click on "start the installation" at the bottom of the page, accept the installation to install the application and the process will be started.



**Figure 45 - Start the installation**

If Microsoft .Net 4.6 is not installed on your system, this tool must be installed before installing Taro. In order to install this tool, please go to the Installation section at the Quickstart.html file and select the link *Microsoft .Net 4.6 Installation (English)*.



**Figure 46 - Microsoft .Net 4.5 Installation (English)**

Note: For another languages Microsoft .Net 4.6 can be installed directly from Microsoft or contact your IT department.

## 5.3 License for Taro 5.3

No license request or import is required to start using Taro 5.3 if you already have a license file for 4 or 5.2.

In case you face any issues regarding license please contact DNV GL Software support team at [Software.Support@dnvgl.com](mailto:Software.Support@dnvgl.com).

## 6 MAKING THE MOST OF THE DOCUMENTATION

Taro 5.3 presents different sources of information. Please find below a description of each of them:

### User Manual

The *Taro* folder in the installation (typically under "Program Files (x86)\DNVGL") contains a Taro user guide called Manual.pdf, which provides you with a wide range of information about the program, and should enable you to find answers to most of the questions you may have about Taro. The Taro guide contains all the Online Help pages and more and should be the main resource of information about the software.

### Help system

The Online Help for Taro 5.3 is in the form of a \*.chm file—a compiled HTML Help file. The file will be installed with the rest of the Taro 5.3 files when you install the program, and you will normally access it using the Help menu, but you can also open and read the file directly (located in the Taro 5.3 installation folder).

In order to read the files, you must have Microsoft Internet Explorer Version 5 or later installed on your PC, although it does not have to be your default browser. You must also have some additional files that are specific to Microsoft HTML Help; these are installed automatically during the Taro 5.3 setup process, so you should be able to read the files directly if you have already installed Taro 5.3.

### Blog

DNV GL Software's blog discusses topical issues, challenges and market observations relevant for software for managing risk and improving asset performance:

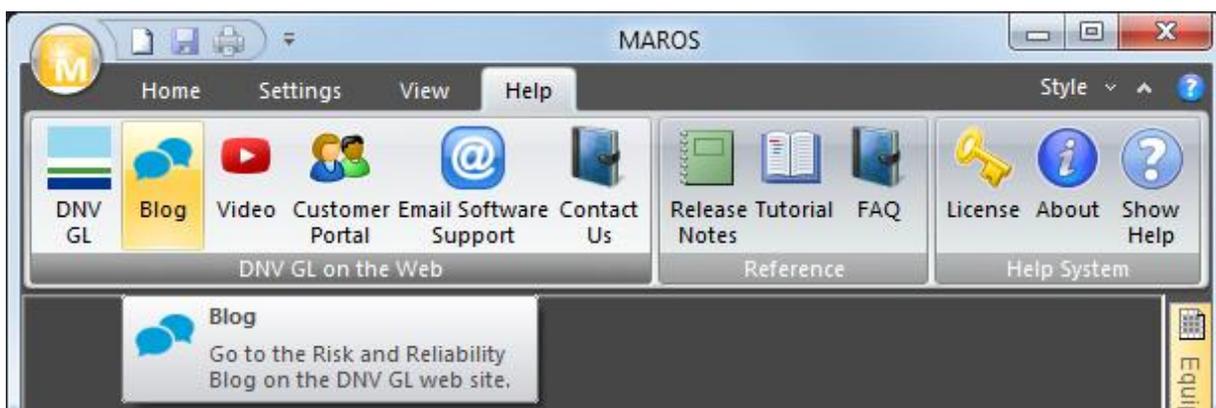
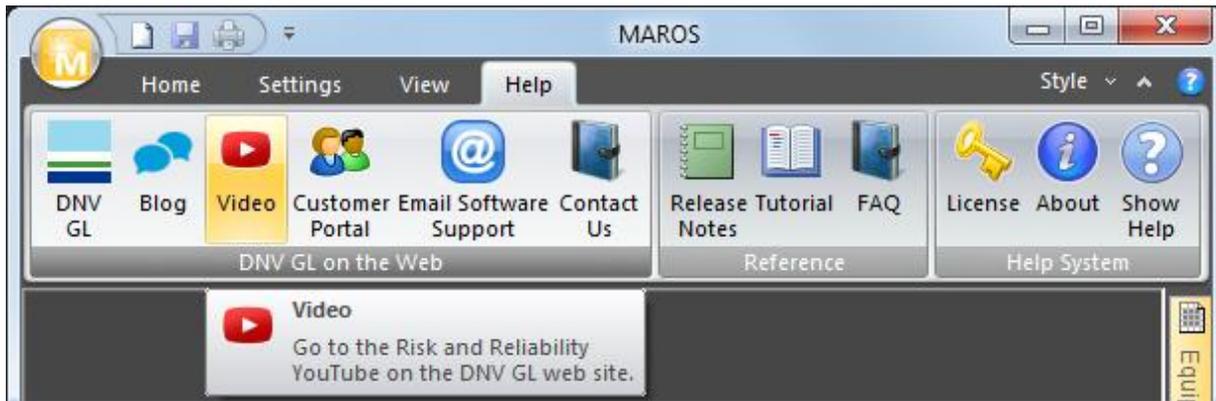


Figure 47: Blog button in the Help tab

### Videos

Maros and Taro e-learning centre has been designed to support clients that are new to Maros and Taro.



**Figure 48: Video button in the Help tab**

The idea is that we can add more videos to [Maros and Taro e-learning centre](#) so please get in touch with ideas of what you would like to see there.

The videos currently available are:

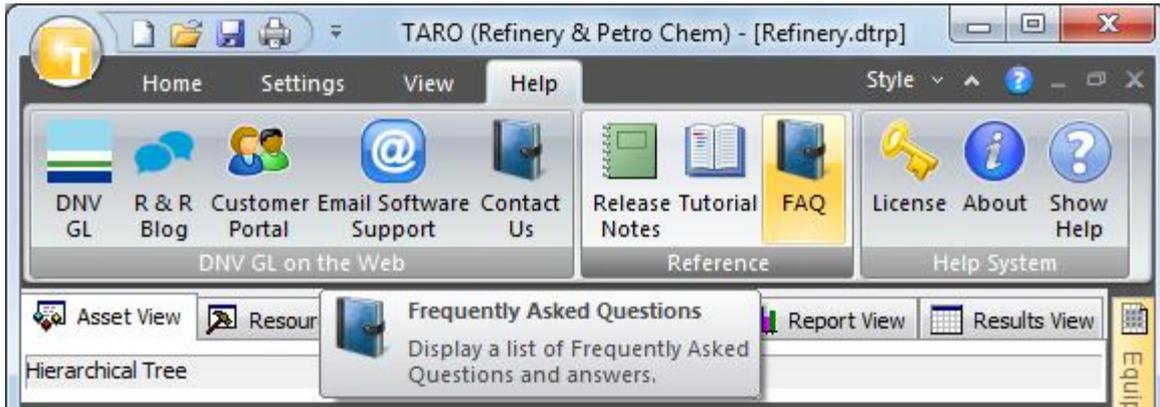
- [Building up a model in 6 steps](#): This video describes the six main steps to build-up a Maros model.
- [Maintenance Resource Modelling in Maros and Taro](#): This video takes the model we created in the "Building up a model in 6 steps" and extends the model to account for Maintenance Resources Modelling.
- [Priority of Maintenance tasks](#): This video takes the model we created in the "Maintenance Resource Modelling in Maros and Taro" and extends the model to account for maintenance repair priority.
- [Lifecycle cost analysis](#): This video takes the model we created in the "Maintenance Resource Modelling in Maros and Taro" and extends the model to account for Lifecycle cost analysis.
- [Multi-product modelling and Production Capacities](#): This video describes how users should use the model multi-products in Maros.
- [Flaring operations](#): This video takes the model we created in the "Multi-product modelling and Production Capacities" and extends the model to account for flaring operations.
- [New Interface in Maros and Taro](#): This video describes the advantages of the new interface in Maros 9.2.
- [Implementing Planned Renewals using Maros and Taro](#): This video describes how to implement planned renewals in Maros.
- [Optimising frequency of Planned Renewals](#): Sensitivity Manager can be used to optimize the frequency of Planned Renewals.

## Frequently Asked Questions

These documents try to highlight the main aspects of Taro 5.3. The areas covered by the FAQs are:

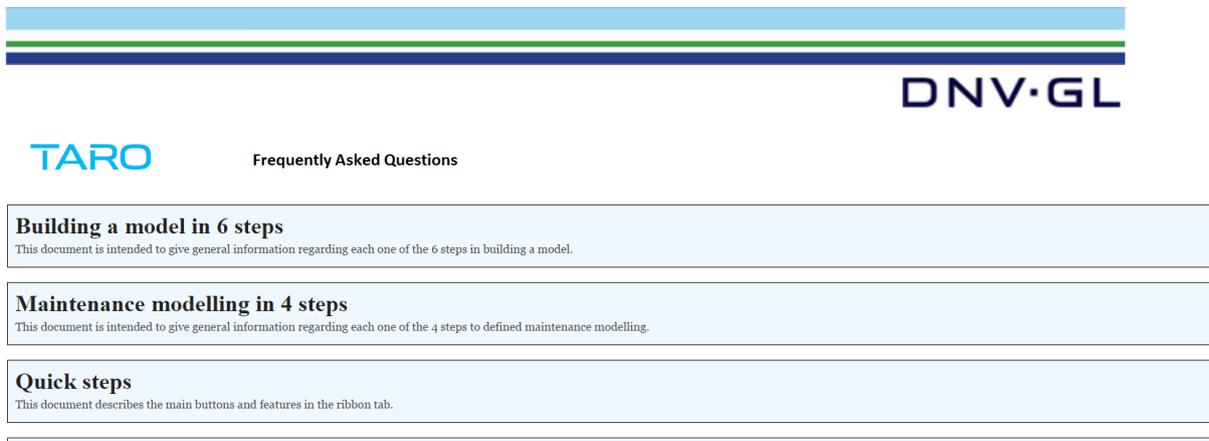
- Building a model in 6 steps
- Maintenance modelling in 4 steps
- Quick steps
- Switches in unit operating modes
- Breakdown of Utilisation Losses

You can find these FAQs under the Help Menu:



**Figure 49: FAQs button at Help tab**

Clicking on FAQs button will prompt your default browser with a list of FAQs:



**Figure 50: List of FAQs**

Clicking on any item on the list will prompt another tab with the FAQ:

Frequently Asked Question

# TARO

## Building a model in 6 steps

This document is intended to give general information regarding each one of these steps – more information about each step can be found under the Taro help system or by contacting [DNV GL software](#).

In order to build a model in Maros, the user is required to follow the steps below:

- 1 - Simulation parameters
- 2 - Flow network - Branches
- 3 - Flow rates - View >> Flow >> Table
- 4 - Defining a System - SY button from the tool
- 5 - Defining my equipment item
- 6 - Defining my reliability data

**Follow the sequence of red squares to build a simple model and practice the process!**

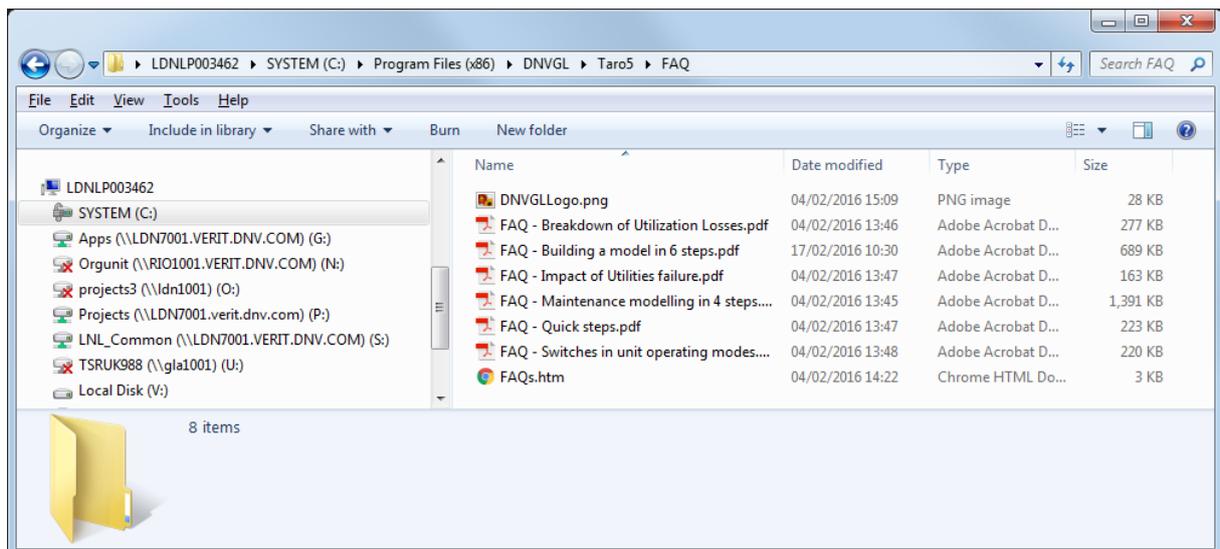
### SIMULATION PARAMETERS

Simulation parameters where you define your system life, number of lifecycles and design capacity:



**Figure 51: FAQ document**

You can also see the FAQs under the Taro 5.3 folder inside C:\Program Files (x86)\DNVGL\Taro5\FAQ.



**Figure 52: FAQ folder**

In case you need more information about a specific modelling approach or feature, please contact DNV GL Global support.

## Tutorials

The tutorials have been separated into two categories:

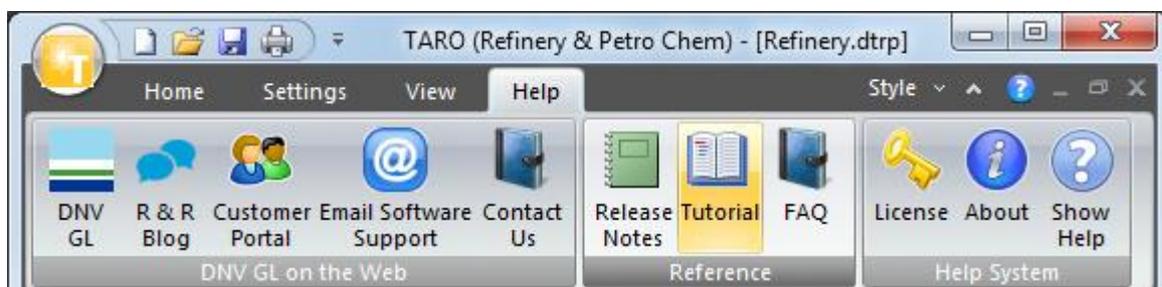
- Guidelines on building models and;
- Simple walk through modelling capabilities.

For the “Guidelines on building models” category, users are led through the main steps to build either a full model or a section of a model.

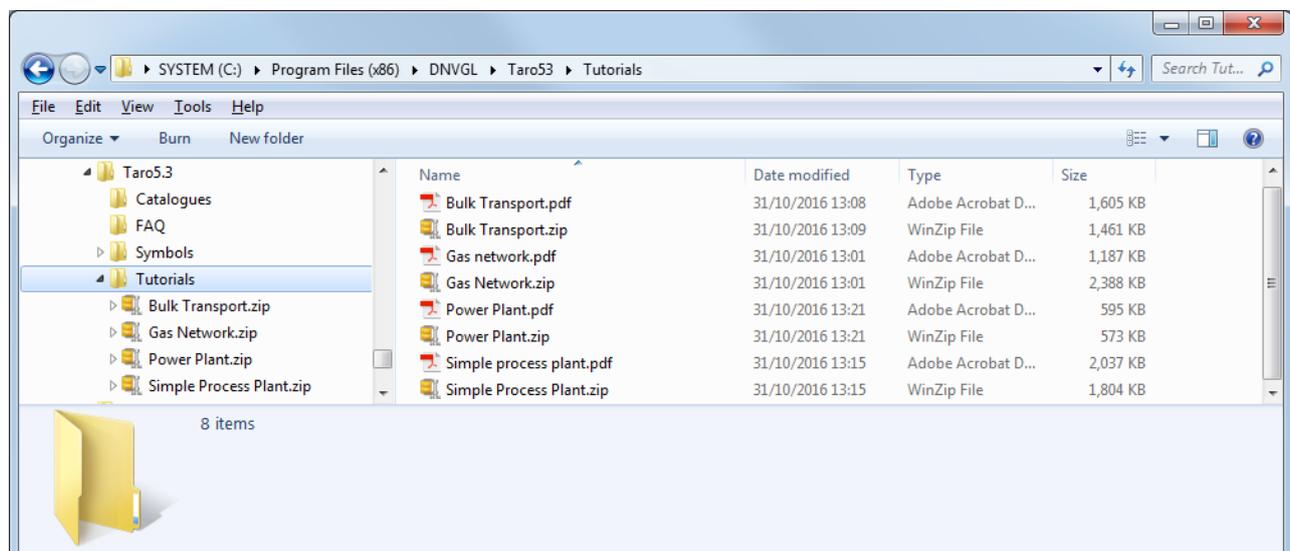
For the “Simple walk through modelling capabilities” category, users are advised to open a reference model to follow the steps described on the tutorials.

Each tutorial is intended to focus on a specific set of features and asset. Obviously, the experience acquired when performing the tasks can be extended to model other scenarios/assets.

You can find the tutorials at Help Tab by clicking on Tutorials.

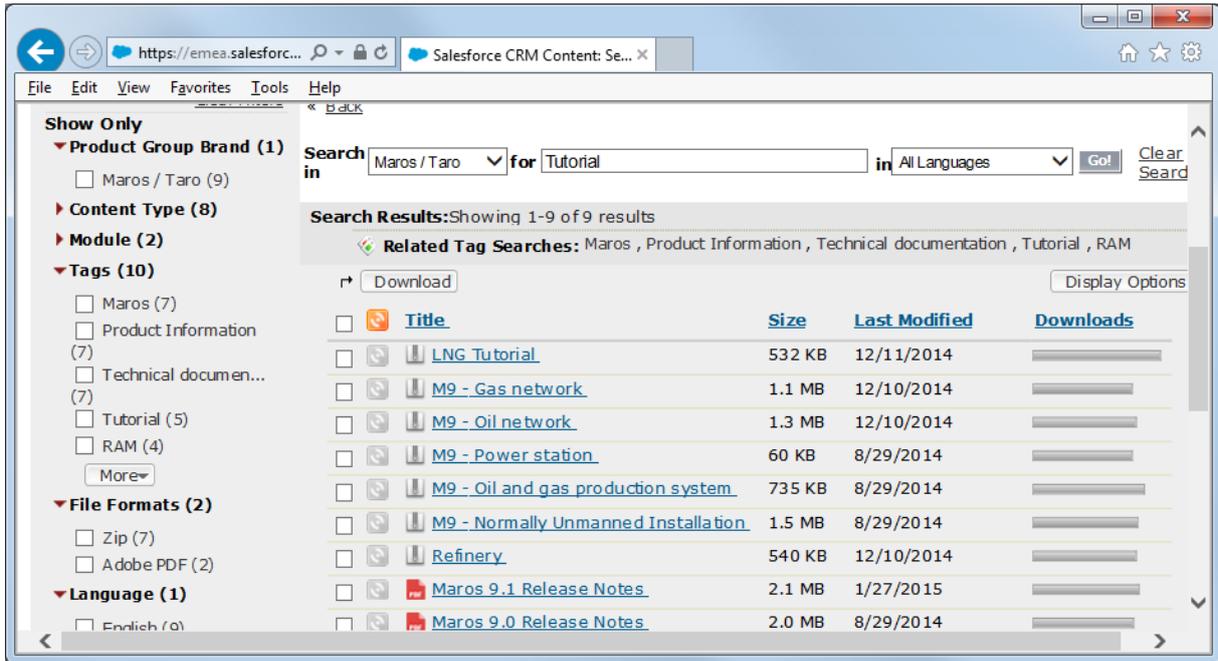


This will prompt another window:



**Figure 53: Tutorials folder**

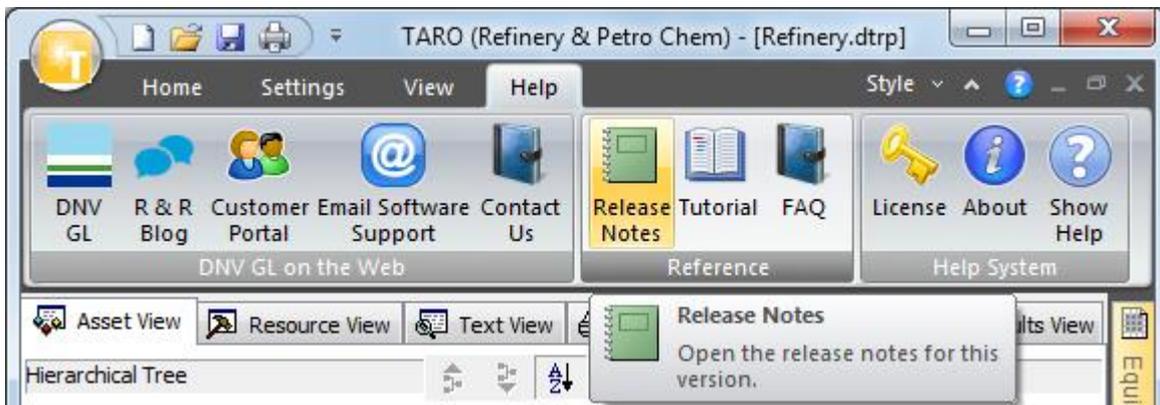
In addition, Tutorials can be found in the Content tab of DNV GL’s Customer Portal. Choose the Content tab and select Maros/Taro library. Then search for “Tutorial” – a list of all the tutorials will be shown:



**Figure 54: Searching at Maros/Taro library for tutorials**

## Release Notes

These Release Notes are supplied in the Help tab, as shown below.



**Figure 55: Release Notes at the Help Tab**

You can also find it in \*.PDF form, for future reference in the installation folder.

## 7 TECHNICAL HELP

DNV GL will provide support in accordance with contractual conditions, which normally includes full software support, limited hardware support and optional application consultancy support.

If you require technical support, please contact us using one of the methods below.

### 7.1 Report a Problem Feature

In order to keep improving the user experience and stability of Taro 5.3, it is really important for us to receive feedback in regards to any problems faced during the modelling process or even a feature request and change suggestion. This report can be easily sent to our Global support group by using the Report a Problem Feature under the Help Menu.

The process is simple. It consists of completing the form shown in the Figure 56 below. The Support Feedback application will then gather all the relevant information including operating system, software version and opened study files and send it to DNV GL Global Support group.

**Figure 56: Report a Problem**

When completing the form, it is also very important to provide as much information as possible to help us understand the problem and provide a fast and proper solution.

You can select between three options:

**Figure 57: Report type**

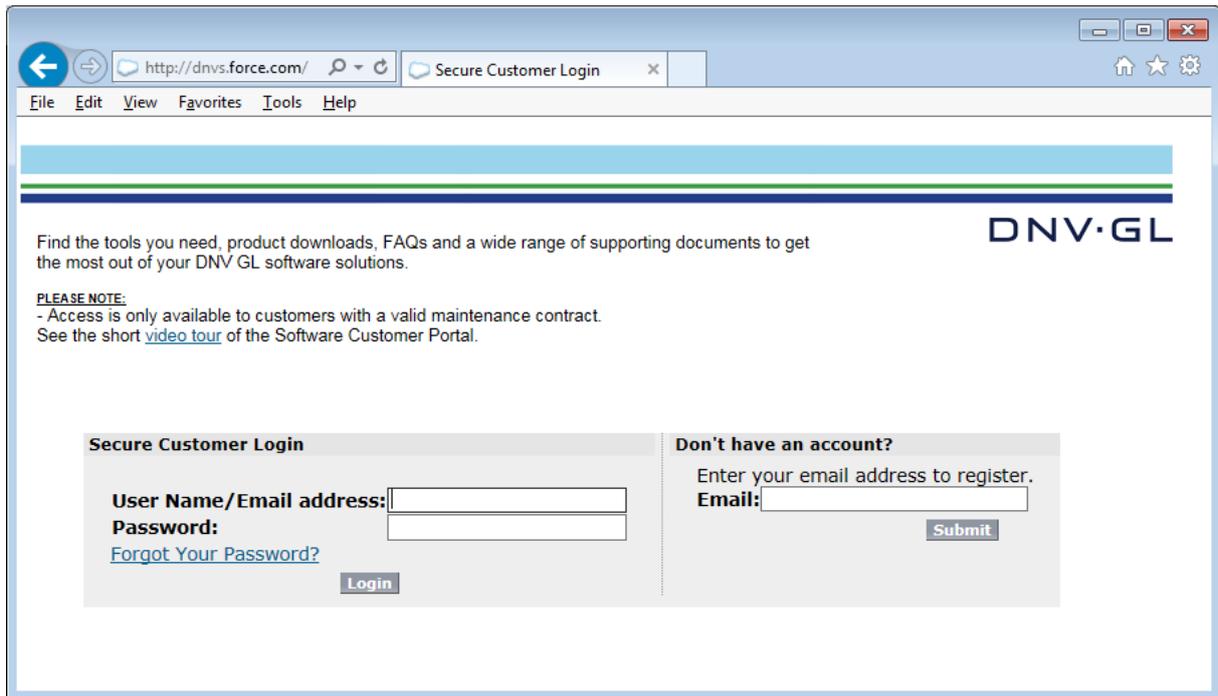
The email report can be copied to other people by selecting the "Cc" button and entering the necessary email addresses. On completion of these steps press the Send button.

Under the User Report tab enter your Name and Organization and select the Report Type you require. A brief description of the problem should be entered under Problem Overview, and a detailed description of the problem (preferably step by step) and how it can be repeated, should be provided in Detailed Problem Description. Any models which are currently being used will be automatically attached to the email. Should any other files be required, such as a Word document or Excel spreadsheet, they can be attached by clicking on the Add button and selecting the necessary file. The email report can be copied to other people by selecting the Cc button and entering the necessary email addresses. On completion of these steps press the Send button.

DNV GL will then automatically receive the model(s) attached and the version number of the software being used. Details of the hardware specification of the machine being used, the operating system and the hard disk status will also be included.

You can follow up your cases and development requests at the Customer Portal.

All you must do is log into the Customer Portal and select the Cases tab, as shown below:



**Figure 58: Cases at Customer Portal**

## 7.2 Direct email

If you need advice on using Taro 5.3 or specific detailed technical information, you can also contact [software.support@dnvgl.com](mailto:software.support@dnvgl.com).

## 7.3 Telephone contact

When you call please identify the application, version number and the serial number of the software protection key (dongle).

In order to find the contact of your local office, please refer to the link below:

<http://www.dnvgl.com/services/software/contactus/>

## 8 FOR SYSTEM ADMINISTRATORS: TECHNICAL NOTES

These notes give technical details to help you improve the performance of Taro 5.3 on your system. They are aimed mainly at secondary support personnel (e.g. IT professionals), but may be useful for expert users.

### System Requirements

Taro uses computational techniques that will depend strongly on the performance of the CPU. In general, the more powerful the CPU, the better the user experience. So, a twin-core CPU with a higher clock speed will probably outperform a quad-core CPU with a lower clock speed. Study size is another factor and users with large studies will benefit from as much memory as possible.

The requirements for version 5.3 are as follows:

**Table 2: System Requirements**

	<b>Minimum Requirements (small models)</b>	<b>Recommended</b>
Operating System:	Windows Vista (32-bit versions) Windows 7 (32/64-bit versions) Windows 8 (32/64-bit version) Windows 10 (32/64-bit version)	Windows 7 (64-bit versions)
Computer Processor*:	Intel Core or equivalent	Quad Core Intel Core i5/i7
Computer Memory:	2 GB	8 GB or more
Clock speed (MHz)	800 MHz	3GHz or higher
Internet Browser	Supported version of Internet Explorer.	
Screen Resolution:	A resolution with a minimum height of 720 pixels	
Hard disk space (MB)	650 MB (plus around 2GB of temporary disk space)	
Optional Requirements	Some features depend on having Microsoft Excel installed. The product is tested with Office 2010 and more recent versions.	

\* Note: simulation time is related to the processor speed so the faster the CPU the sooner the simulations run.



## **ABOUT DNV GL**

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.

## **SOFTWARE**

DNV GL is the world-leading provider of software for a safer, smarter and greener future in the energy, process and maritime industries. Our solutions support a variety of business critical activities including design and engineering, risk assessment, asset integrity and optimization, QHSE, and ship management. Our worldwide presence facilitates a strong customer focus and efficient sharing of industry best practice and standards.