

# PLEXOS 6.203 Release Notes

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*Updated: -*

Welcome to PLEXOS 6.203. This note briefly describes the features implemented in this new release. Please refer to the help file for details and examples.

We start with an overview of the key points that all upgraders should read and then go point-by-point through all changes and new features.

## 1 What You Need to Know

Your 6.201, 6.202 (or 5.201) database will be upgraded automatically and should function just as before. There should be no manual upgrading required.

### 1.1 Changes

The following algorithmic changes have been implemented in this version:

1. The Convergent Monte Carlo method has been changed so that convergence of outages is performed individually for each Generator/Line rather than across each Region. This change means that setting the Generator/Line [Random Number Seed] property will guarantee that outage sequences are repeatable across simulations with different numbers of Generator/Line objects whereas previously the linking of 'expected outage' overall each Region meant that adding objects would result in different sequences of outages. This point does not apply to standard Monte Carlo for which results are always repeatable when seeds are set.
2. Generator/Line [Maintenance Frequency] is now handled by the Standard Monte Carlo method. Previously the Convergent Monte Carlo method was invoked whenever this property was defined.
3. In the case where Stochastic [Risk Sample Count] (or [Reduced Sample Count]) is not equal to [Outage Pattern Count] the previous approach of randomly assigning outage patterns to samples is replaced by a simple ordered assignment.

The above changes result in a difference in sequence of random draws for many models.

### 1.2 Features

#### 1.2.1 Modelling Day-ahead, Real time/balancing Markets

A number of input properties have been added to aid in modelling day-ahead and real-time markets (and balancing markets). For example the Generator properties [Pump Bid Base], [Pump Bid Quantity], [Pump Bid Price] provide a means of linking day-ahead pumped storage solutions to real-time (balancing) simulation. An alternative here is [Fixed Pump Load] and [Fixed Pump Load Penalty]. These properties mirror the generation-side properties [Offer Base], [Offer Quantity] and [Offer Price] and the alternative approach of using [Fixed Load] with [Fixed Load Penalty].

#### 1.2.2 Sample Reduction

Sample reduction takes the 'raw' generated samples (Stochastic [Risk Sample Count]) and reduces these to a small number (Stochastic [Reduced Sample Count]) for use in the simulation. This reduction is done statistically using a Scenario Tree approach. More information is available in the help. This feature is particularly useful for stochastic optimization where the number of samples included in the optimization can have a big impact on solution times.

### 1.2.3 Pump Load Bidding

The new input properties Generator [Pump Bid Base], [Pump Bid Quantity] and [Pump Bid Price] define balancing market (real-time) bids for pumped storage generators' pump load. See the article "Balancing Markets" for more details.

### 1.2.4 Hydro Head Effects

TBA.

### 1.2.5 Improved support for real-time market data

New attributes have been added to the Data File class that can help when reading data that has come from market systems:

- The Data File [Locale] attribute is used to set the LCID (culture information) for the file and applies when the file uses a DATETIME field. Setting this ensures that the date and times in the file will be read correctly regardless of the local machine's culture settings.
- The Data File [Datetime Convention] attribute controls how the time part of the DATETIME is interpreted. Real-time market data often uses the convention of labelling dispatch intervals according to the end time of the interval. For example the first half-hour of the day might be labelled 12:30 rather than the 'planning convention' of labelling this period 12:00. This attribute allows you to read data with "End of Period" convention as well as the default "Beginning of Period".

We have also added Report [Datetime Convention] attribute which controls the output of DATETIME fields in both text and database solutions. Thus you can output data with "End of Period" convention for times if that suits the market being studied.

### 1.2.6 LDC Type

LT Plan now support [LDC Type] = "Year".

### 1.2.7 Pass-through Properties

Most classes of object now support "pass-through" properties with the generic names "x", "y", "z". These inputs are passed through to the solution and do not affect the simulation. They are useful for passing real market results through to the solution so they can be easily compared to simulated results inside the user interface. For example you may want to pass the actual market prices through as Region [x] so that this can be compared to Region [Price] in the solution. Note that the user interface does not yet support editing these property names, but they can be changed directly in the XML input file and the simulation engine will preserve those changed names in the solution.

## 1.3 Line and Interface Offers

The Line and Interface classes now implement the full range of offer properties including balancing market offers using [Offer Base].

## 1.4 Release Status

This document is current as of Revision "R01" at the date given above. All features planned for the final revision of 6.203 are listed below. The following table acts as a guide to the symbols shown next to those "unfinished" features at this time:

	Meaning
	Complete and ready for use.
<i>n</i>	The feature was implemented in Revision <i>n</i> and so is only available in that Revision or later.
	Unfinished but usable <i>e.g.</i> the documentation or full testing might not be complete yet but the feature is basically functional and has passed a reasonable level of testing.
	Not yet implemented. Don't use this feature until we release an update with it finished.

## 2 User Interface

No significant changes.

## 3 New Inputs

The following table lists all the new input properties available in this release. Please refer to the help for detailed information.

Collection	Property	Relates to
<b>Generator</b>	Fixed Pump Load	Day-ahead to real-time/balancing markets
	Fixed Pump Load Penalty	"
	Pump Bid Base	"
	Pump Bid Quantity	"
	Pump Bid Price	"
	Fixed Charge	Input of 'generic' fixed cost components with multiple bands
	Commission Date	Automatic retirement of incumbent plant based on [Technical Life] in LT Plan
<b>Generator Head Storage</b>	Efficiency Point	Hydro head effects
	Efficiency Scalar	"
<b>Generator Tail Storage</b>	Flow Point	"
	Efficiency Scalar	"
<b>Emission Generators</b>	Price Scalar	Enhancement to existing [Shadow Price Scalar] property
<b>Reserve Generators</b>	Max Response Factor	Alternative to existing [Max Response] property
	Max Sync Cond Response Factor	Alternative to existing [Max Sync Cond Response] property
	Max Pump Response Factor	Alternative to existing [Max Pump Response] property
	Max Replacement Factor	Alternative to existing [Max Replacement] property
<b>Line</b>	Fixed Flow Penalty	Enhancement to existing [Fixed Flow] property
	Offer Base	Day-ahead to real-time/balancing markets
	Fixed Charge	As above for Generator
<b>Interface</b>	Units	To make Interface class consistent with other transmission classes that have a Units on/off switch
	Fixed Flow	Day-ahead to real-time/balancing markets
	Fixed Flow Penalty	"
	Offer Base	"
	Offer Quantity	"
	Offer Price	"
	Offer Quantity Back	"
	Offer Price Back	"
<b>Constraint Generators</b>	Pump Units Started Coefficient	For use in modelling 'pay-back' of demand response schemes
<b>Data File</b>	Upscaling Method	Handling text data files of different resolution to simulation
	Downscaling Method	"
	Datetime Convention	Support for use of DATETIME as end of period
	Locale	Specific the culture for the Data File
<b>Model</b>	Execution Order	Controlling execution order of Models in a batch run
<b>LT Plan</b>	Maintenance Sculpting	Allows for control over when LT Plan sculpts maintenance derating of plant.
<b>Report</b>	Datetime Convention	Support for use of DATETIME as end of period
<b>Stochastic</b>	Convergence Period Type	Convergent Monte Carlo
	Reduced Sample Count	Sample reduction in multi-sample simulations using Variable objects
	Reduction Relative Accuracy	"
	Forced Outages in Look-ahead	Day-ahead to real-time/balancing markets
<b>Performance</b>	Small MIP Improve Start Gap	Performance of mixed-integer programming models
	MIP Improve Start Gap	"

## 4 Moved Inputs

N/A

## 5 Input Changes

Some properties are renamed as in the following table.

Collection	Old Name	New Name
<b>Constraint Generators</b>	Spare Capacity Reserve Coefficient	Spinning Reserve Coefficient
	Pump Interruptible Load Coefficient	Pump Dispatchable Load Coefficient
<b>Stochastic</b>	Monte Carlo Outage Patterns	Outage Pattern Count
	Monte Carlo Weibull Shape	Weibull Shape
	Monte Carlo Convergent Smoothing	Convergent Smoothing
	Monte Carlo Outage Scope	Outage Scope

## 6 New Outputs

Collection	Property	Note
<b>Generator</b>	Ramp Up	The total megawatt of ramping up done
	Minutes of Ramp Up	complementary to Generator [Ramp Up]
	Ramp Down	The total megawatt of ramping down done
	Minutes of Ramp Down	complementary to Generator [Ramp Down]
	Pump Units Started	Goes with new input Constraint Generators [Pump Units Started Coefficient]
	Fixed Pump Load	See above input Generator [Fixed Pump Load]
	Fixed Pump Load Violation	"
	Hours of Fixed Pump Load Violation	"
	Fixed Pump Load Violation Cost	"
	Pump Bid Base	See above input Generator [Pump Bid Base]
	Pump Bid Quantity	"
	Pump Bid Price	"
	Pump Bid Cleared	"
	Cleared Pump Bid Price	"
	Cleared Pump Bid Cost	"
	Pump Price Paid	"
	Forced Outage Rate	Additional reporting of outages
Maintenance Rate	"	
<b>Reserve Generators</b>	Spinning Reserve Provision	More explicit reporting of Reserve [Provision]
	Sync Cond Reserve Provision	"
	Pump Dispatchable Load Provision	"
	Non-spinning Reserve Provision	"
<b>Region</b>	Min Load	Opposite of existing [Peak Load]
<b>Region Regions</b>	Available Transfer Capability Back	Directional version of existing ATC output
<b>Zone</b>	Min Load	As above
<b>Zone Zones</b>	Available Transfer Capability Back	As above
<b>Node</b>	Min Load	As above
<b>Line</b>	Fixed Flow	Enhanced reporting of existing Line [Fixed Flow] solution
	Fixed Flow Violation	"
	Hours of Fixed Flow Violation	"
	Fixed Flow Violation Cost	"
	Offer Base	See above input Line [Offer Base]
	Cleared Offer Price	Enhanced reporting of Line offer solution
	Cleared Offer Cost	"
	Available Transfer Capability Back	As above
	Forced Outage Rate	Additional reporting of outages

	Maintenance Rate	"
<b>Transformer</b>	Available Transfer Capability Back	As above
<b>Interface</b>	Fixed Flow	See above input Interface [Fixed Flow]
	Fixed Flow Violation	"
	Hours of Fixed Flow Violation	"
	Fixed Flow Violation Cost	"
	Offer Base	See above input Interface [Offer Base]
	Offer Quantity	"
	Offer Price	"
	Offer Quantity Back	"
	Offer Price Back	"
	Offer Cleared	"
	Offer Cleared Back	"
	Cleared Offer Price	"
	Cleared Offer Cost	"
	Available Transfer Capability Back	As above

## 7 Changed Outputs

N/A

Collection	Property	Notes

If you have comments or questions please contact [support@energyexemplar.com](mailto:support@energyexemplar.com)

The Energy Exemplar Development Team