greenius Release Notes

By using greenius simulation software or its installer you agree to the license conditions which you can find in the manual.
The manual can be downloaded from the greenius website (freegreenius.dlr.de) or be found in the greenius installation directory.

Version 5.3.0.4
Date: 22 July 2026
Changes:
- Expanded the "Process heat according to ISO 9806" configuration to include all collector field parameters present in the parabolic trough field. This includes cleanliness, availability, shut down wind speed, expanded parasitics, etc.
- Minor bug fixes

Version 5.3.0.3
Date: 6 May 2026
Changes:
- Development of stratified storage model
- New technology configuration with solar collector field based on ISO 9806 yield calculation, stratified storage, heat pump and boiler
- Update of the SolarKeymark database

Version 5.3.0.2
Date: 12 January 2026
Changes:
- New Version of the Solar Keymark database with collectors testet until december 2025
- The simple storage type may now be used as seasoal storage if the capacity is large enough
  The start content at he 1. Janary must be set by the user in this case
- The numbering of storage types has been changed, this may cause problems when older Project files are opened

Version 5.1.0.7
Date: 12 November 2025
Changes:
- Import of *.epw meteo files corrected (should now work correct on systems with German number format)
  and not stop should be occur if entries for irradiation and windspeed are negative
- Default installation folder changes to C:\Users\User_name\AppData\Roaming\Greenius to grant full access
  to this folder and all subfolders for users without admin rights

Version 5.1.0.3
Date: 22 October 2025
Changes:
- Minor Bugfixes in the German user interface for ISO 9806
- Calculation of solar field efficieny and total efficiency in TOY corrected
- Corrected output of efficiencies for process heat according ISO 9806 in TOY
- Added Helisol XLP as fluid for the ISO 9806 model

Version 5.1.0.1
Date: 22 August 2025
Changes:
- Bugfixes in the IAM and shading calculation for ISO 9806 models
- Additional results for ISO 9806 simulation
- 2 large parabolic trough collector datasets added to ISO 9806 simulation to enable their simulation using the same models as for non concentrating collectors
- Adapted fluid properties for pressurized water
- Several minor bug fixes

Version 5.0.0.3
Date: 21 May 2025
Changes:
- The new ISO 9806 and ISO 24194 standards for solar thermal collectors have been implemented
- The "Process Heat with non-concentrating collectors" technology has been replaced by "Process Heat according to ISO 24194", as the standard also allows simulation of parabolic concentrators. Projects created with the previous technology are no longer supported and have been replaced by the new one.
- The Solar Keymark database has been added, allowing users to simulate the included collectors
- In the solar field for collectors, shading and land use are now calculated, and it is possible to choose the type of fluid and the method for calculating heat losses in the piping
- Minor bug fixes
- Compiled with the new Delphi Version 12.3

Version 4.1.0.2
Date: 30 Oct 2024
Changes:
- The collector field has now 3 Parameters to define the size nloops, rows, and ncols
- Bug fix for process heat plants with storage and load curve: the TES was not discharged in Version 4.9
- For the molten salt Tower system the auxiliary power demand is now corrected for Dumping
- The Typical Operation Year graphical output window offers now zooming with the mouse
- Compiled with the new Delphi Version 12
- Several minor bug fixes

Version: 4.9.0.1
Date: 10 Jan 2022
Changes:
- Additional systems implemented: Parabolic trough power plant and molten salt tower plant with fluctuating electricity source and electric heater
- Tariff period with LCOE weighting now possible
- PV inverter output limited and clipping introduced
- Separation of the costs of the PV modules and inverter
- Minor Bug fixes

Version: 4.5.0.1166
Date: 11.12.2019

Changes:
- For single axis tracked PV systems the tracking angle can be limited
- CSP: power block cool down model implemented consider startup energy after several shutdown hours
- New Sundials version 4.0.2 included

Bug Fixes:
	-> In PV projects now a load curve may be defined and if a battery is included in the system, excess power will be stored and used when the PV panels deliver less energy than required.
	-> Several minor bug fixed

Version: 4.5.0.1108
Date: 15 Jun 2018
Changes:
- Minor Bug fixes

Version: 4.5.0.1052
Date: 27 Apr 2018
Changes:
- The default installation directory is no longer in the user home directory, but the standard Windows directory (e.g. C:\Program Files\greenius)
- The power block component received two additional parameters in order to define transformation losses from medium voltage to high voltage as well as transmission losses between the plant and the grid integration point. Includes minor modifications of the power block component form.
- Implementation of thermal startup losses of the receiver in tower systems
Bug Fixes:
	-> Fixed a bug which could lead to deviations in the automatic pipe length and fluid mass calculation, when using the command line to call greenius.

Version: 4.4.0.1 (Unpublished)
Date: 05 Feb 2018
Changes:
- The central operator instance (COP) is now used for all technologies based on parabolic troughs, solar towers and Photovoltaics.
- A default molten salt tower system component for the southern hemisphere comes now shipped with greenius (latitudes 20°-40° south).
- Photovoltaic-Technology: Electric batteries are now available within all PV technologies.
- Economics->Costs: A new cost feature has been introduced:
	-> It is now possible to define so-called additional O&M-Costs for each year of operation. This can be used for example to model the costs of a required battery replacement during the operational period.
- The enhanced model (spatially and temporally resolved) for parabolic trough collectors has been overhauled:
	-> The enhanced model can now be used to simulate single phase heat transfer fluids (e.g. molten Salt)
	-> The same model is now used for evaporator, 1Through, evaporator+superheater and single phase fluids
	-> The new enhanced model contains a unit called fluid buffer. It is used as expansion tank within in the numerical model.
	-> The new enhanced model has been validated thoroughly. Nevertheless be aware of the possibility that unusual behaviour of your model could also be

related to bugs.
- Line focus collectors (only in combination with enhanced model):
	-> The thermal loss coefficients b_i and optical efficiency can be defined for each section of the representative simulated loop and each operational year. This may for example be used to model HCE damages and replacements.
	-> The etaOptModifier parameter allows the manipulation of the given optical efficiency, e.g. in order to model or investigate individual cleaning strategies.
- Fresnel Collectors: As of this version the incidence angle modifier (IAM) for Fresnel collectors shall include not only cosine losses (was already the case), but ALSO collector end losses.
- Meteo Data Component: No window with information about the loaded data is shown anymore when a meteo data component is loaded.
- The menu entry File->Preferences now allows to review the standard component folders and default component files. Both may be changed if necessary.
- Bug Fixes:
	-> Save-Changes dialog response "No All" should now work flawlessly.
	-> Overwrite-Changes dialog when importing projects should now work as expected on "No all".

Version: 4.3.2.2 (Unpublished)
Date: 22 Nov 2016
Changes:
- Use original code (TOY) instead of new Central Operator Unit

Version: 4.3.2.1 (Unpublished)
Date: 21 Nov 2016
Changes:
- Implementation of central operator instance (COP) for the simulation of CSP technologies.
	-> COP is fully operational for tower technology
	-> For trough technology, the COP does only work for electricity generation im combination with the simple field model
	-> Enhanced field model as well as heat and cold generation are not yet implemented

Version: 4.3.1.2
Date: 18 Aug 2016
Changes:
- Calculation of solar towers has been basically remodelled
	-> Molten salt tower systems can now be calculated with greenius in addition to volumetric air receiver technology
	-> Predefined molten salt tower system comes with greenius
	-> Tower field and receiver are now integrated in a single tower system component
	-> The definition of tower *.gpa files differs from the previous field and receiver files. User-defined fields and receivers have to be migrated manually. Please refer to the manual!
	-> The integer identifier for the fluid type in the *.gpa files have been redefined to be equal to parabolic trough technology.
	-> The calculation of heat losses for tower systems has been changed! Please refer to the manual!
	-> The heliostat field efficiency map is now given at 100% reflectivity,

cleanliness and availability instead of nominal values!
- Cost data for parabolic trough and solar tower technology has been updated to values from study published by IRENA ('The Power to Change: Solar and Wind Cost Reduction Potential to 2025')
- New tabsheet 'timesteps' has been added to form Typical Operation Year. It shows power instead of energy values for the user-defined time step.
- Each component *.gpa file now contains the greenius version it was written with as first line.
- Section on Excel export using the greenius plotter workbook has been added to the manual
- General bug fixing

Version: 4.1.1.1
Date: 07 Dec 2015
Changes:
- Fixed Bug that prevented the costs form to open
- Added 110MWel power block which is not scaled
- Updated inverters for PV technology

Version: 4.1.0.1
Date: 04 Dec 2015
Changes:
- Optimisation of enhanced model (DSG) for parabolic troughs:
	-> About 80% to 90% less computational effort without changes of the physical model
	-> Higher reliability and better convergence of the solver
	-> Number of non-converged steps is now shown in TOY form
- Physical modification of enhanced model (DSG) for parabolic troughs:
	-> Mass flow is no longer kept constant over loop length. Density changes can cause significant deviations of nominal mass flow in transient periods
	-> Introduction of a buffer vessel (fluid buffer) which is necessary because of varying mass flows
- Actualisation of numerous datasets for photovoltaic modules, wind turbines and non-concentrating solar collectors
- Resolved bug that could cause permanently increasing memory usage with enhanced parabolic trough model
- Freeze protection for simple model added
- Implementation of interface for CoolProp steam tables. (Usage not recommended! Very slow!)
- Documentation and modification of the output variables of a solar field with line focusing collectors
- Migration to new software for help system and manual. Both will have identical content from now on.
- The Energy Plus Weather file format (*.epw) can now be read by greenius meteo component
- The MESOR file format (*.txt) can now be read by greenius meteo component
- The default directory for fuel cells is now created at installation and filled with a default file
- Several bugs fixed for fuel cell technology
- Fuel Cell with storage technology had to be deactivated temporarily
- Tariff creator form offers now the same editing functions as load curve form
- Fixed bug which affected the calculation of grid values when changing temporal

resolution in load curve or tariff creator form
- Generalization and improvement of Copy/Paste functions for grids and charts
- The TOY data can now be saved and opened with one click in menu File->Export to Greenius Plotter
- The GreeniusPlotter.xlsm comes now with greenius in order to offer more flexibility for data post processing
- Improved multi screen support
- Example projects Almeria_VTC.gpj and Andasol2014.gpj added

Known Bugs:
- Direct Steam Generation (DSG) model in 1Through configuration probably underestimates the real output. Additionally it is much slower than other configurations.
- Qcol and Qfield are not well calculated for 1Through and Evap+SH configuration in DSG model. However Qout should be correct.

Version: 4.0.8.1
Date: 17 Dec 2014
Changes:
- Additional 21 new wind turbines are now shipped with greenius. Some old turbines were removed.
- Added the 'wind class' property to the wind turbine component. It does not influence the technical simulation.
- Added PV example project Almeria_PV.gpj
- Bug fixes for all technologies. When calculating with finer temporal resolutions than 1h some results were not calculated for the correct time step length.
- Storage parasitics calculation for parabolic trough fixed
- Modified display of technical results for technology 'Process heat with non concentrating collectors'
- Fixed bug that chiller did not for every hour satisfy the given demand curve
- Removed error message at end of simulation of a fuel cell project
- Fresnel collector model was unintentionally change in greenius version 4.0.7.1. The original collector model is now restored.
- Cell Temperature is now displayed correctly in the technical results for PV systems
- For PV systems DC Cable losses calculation has been corrected. DC cable length must now be given as 'Length per string'. The maximum DC-Losses for cable optimization was reduced from 3% to 1%
- The cross section optimization works now in the range from 1.5 to 95 square mm
- These release notes come now with greenius
- greenius manual now comes shipped with greenius

Version: 4.0.7.2
Date: 29 Oct 2014
Changes:
- Fix for a bug that caused an error message when trying to open the power block form
- Minor design changes to the power block form

Version: 4.0.7.1
Date: 27 Oct 2014
Changes:
- Bugfix for a crash that could occur while simulating Fresnel collectors
- The PV cell temperature was added to the result output
- Reference power plant project file Andasol1.gpj is now called Andasol.gpj and contains actualised data
- Numerous bugfixes regarding simulations with a temporal resolution finer than 1h
- Fix for a bug that caused wrong loading of data files on operating systems with another decimal marker than a point
- It is now checked before the simulation start whether a valid chiller component is defined
- The values in the definition tables for load curve, operating strategy and variable remuneration tariff is now automatically scaled when changing the temporal resolution
- Added field for the display of the gross power block efficiency in the power block dialogue
- Removed the parameter 'maximum annual fossil energy' in the boiler dialogue. The heat generation of the boiler is not capped anymore.
- Fix for bug that caused writing useless lines without data when saving load curve data