



Updates and improvements in the latest PVsyst versions

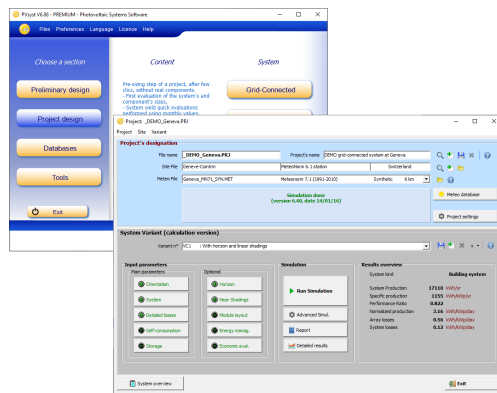
PVPMC Workshop
23,24 August 2022
Salt Lake City, USA

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PVsyst SA, Switzerland

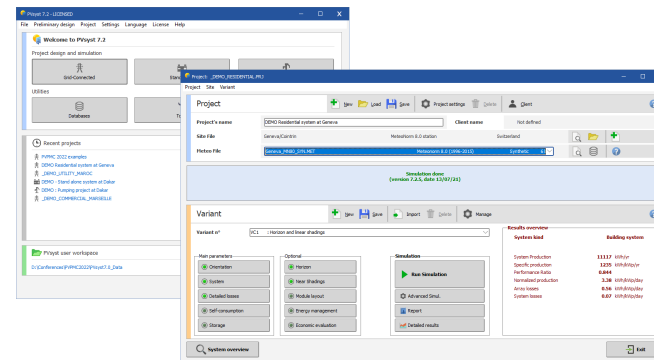
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www.pvsyst.com

Overview

- Last PVsyst presentation at a PVPMC workshop was in 2019 -> PVsyst V6.8.0



- Today we are at PVsyst V7.2.17



Many novelties and improvements have accumulated, here we briefly cover:

- **Improvements in modeling**
- **Improvements in tools**
- **Improvements in user interface**
- **Upcoming features**

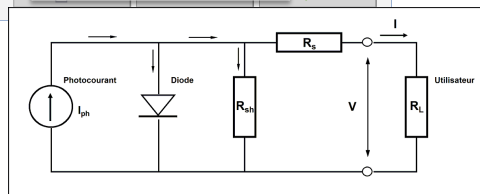
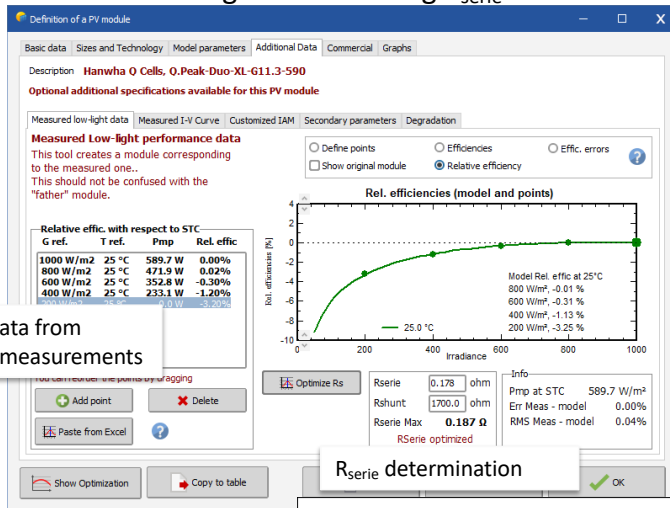


Improvements for PV components

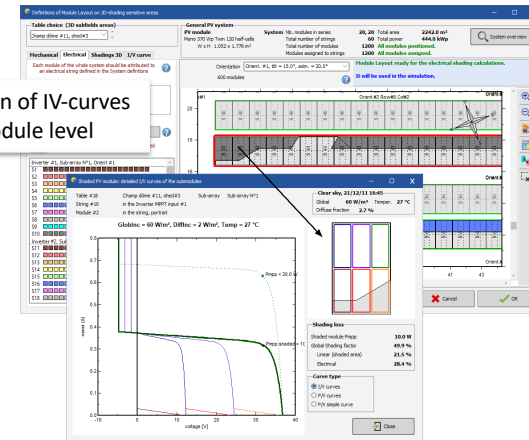
- Improved user guidance for the creation of new PAN and OND files
- Tool for checking or determining R_{series}

- Twin half-cut cell modules in 'Module Layout'

low-light data from IEC 61853 measurements



Calculation of IV-curves on submodule level



- Power optimizers: more manufacturers improved modeling



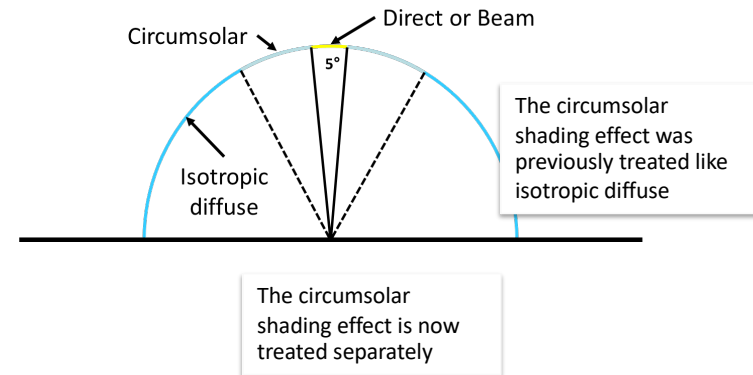
Aging Tool and Transposition

- Multi-year simulations with PV module degradation

- Explicit treatment of circumsolar irradiance

The screenshot displays the 'Aging Tool' software interface. Key components include:

- Define aging properties of PV modules:** A panel for setting thermal parameters like 'Chronic losses', 'Module quality (LID)', and 'Non-uniformity'.
- Select typical year or measured time series:** A section for choosing the input data source, with options for 'Typical year' and 'Measured time series'.
- Multiyear simulation: Full-year simulations dark Interpolations light:** A bar chart showing the 'Performance Ratio' over a 24-hour period, with a legend indicating 'Dark' (red) and 'Light' (blue) periods.
- Simulation results:** A table showing 'PV module aging parameters' such as 'Initial degradation factor' and 'Final degradation factor'.



More flexibility for the System design

- More detail in AC circuit

- Unlimited number of sub-arrays

Add HV and MV transformers

Define different stretches of AC cables

Define transformers from technical specifications

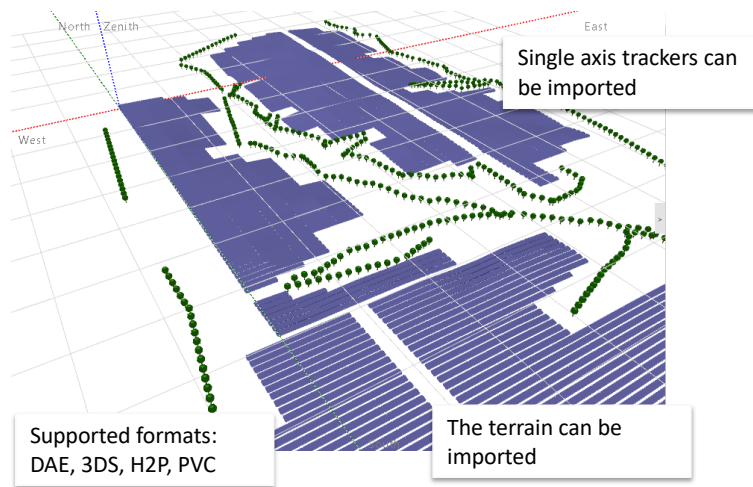
Different subarrays for different configurations PV module type, inverter type, string length, orientation, etc.

Previously limited to 8 sub-arrays, now no limit



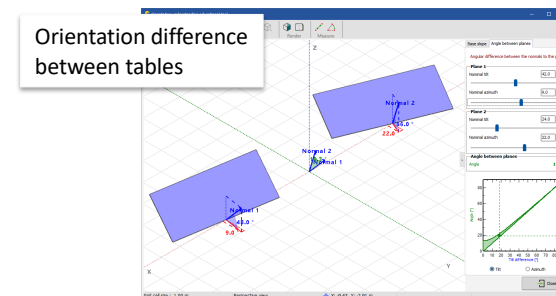
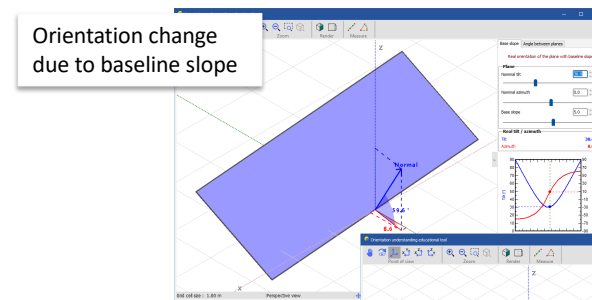
Shadings on complex terrain

- Importing of 3D drawings (including trackers and terrain) from other software packages



PVC format based on open-source Collada (DAE) with additional keywords to describe PV tables and trackers

- Visualization tools for understanding orientations



Advanced Editing Tools

- Multiple selection editing

- Improved Backtracking definitions

Objects can be grouped

Filters can be applied to select objects

Multiple selected objects can be edited in a single step

The backtracking algorithm is based on the geometry of two adjacent trackers

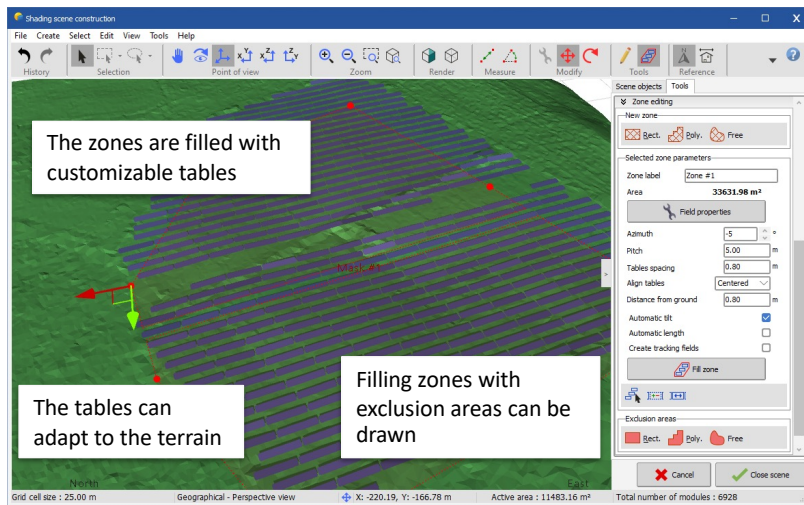
The parameters for backtracking can be customized

Collector path	Polylines	No path	CCR %	# Neighbor	Altitude
14	Tracker #13	8.71	46.3%	12	4.61
15	Tracker #13	8.71	46.3%	13	3.81
16	Tracker #13	8.71	46.3%	14	4.90
17	Tracker #12	8.71	46.3%	15	3.68
18	Tracker #11	8.71	46.3%	16	4.22
19	Tracker #11	8.71	46.3%	17	3.50
20	Tracker #10	8.71	46.3%	18	6.51
21	Tracker #9	8.71	46.3%	19	6.10



Improvements in 3D drawing tools

- Filling zones with automatic height adjustment



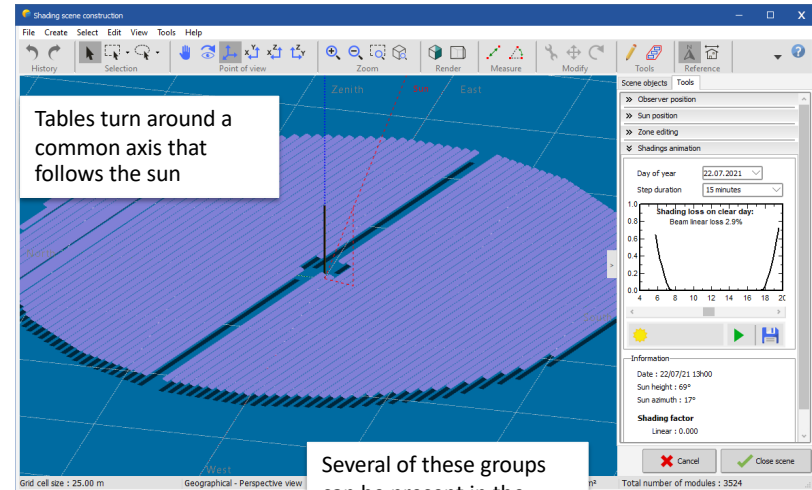
The zones are filled with customizable tables

The tables can adapt to the terrain

Filling zones with exclusion areas can be drawn

The tables can be fixed tilt or SAT

- Tracking systems with a single or several common vertical axes (floating PV)



Tables turn around a common axis that follows the sun

Several of these groups can be present in the same simulation



Weather data

- Updated weather data sources:
 - Meteonorm 8 built-in (prepared for sub-hourly data)
 - Meteonorm API for horizon import
 - Solcast API
 - SolarAnywhere API
 - SolarGIS API (upcoming)
 - PVGIS API (5.2) including multi-year time series and horizon
- TMY generation according to several standards

Importing a horizon line with Meteonorm API

Select weather data time series

Select or customize generation algorithm

Visualize and save the result

Long-term mean values			Generated TMY monthly values				
Month	Global kWh/m ² /h	Diffuse kWh/m ² /h	Temper. °C	Month	Global kWh/m ² /h	Diffuse kWh/m ² /h	Temper. °C
January	61.1	23.4	-3.7	Jan (2009)	62.0	21.4	-3.2
February	80.6	32.3	-0.8	Feb (2009)	76.9	32.2	-1.2
March	132.0	50.4	3.9	Mar (2005)	132.0	45.9	4.4
April	164.7	62.9	8.4	Apr (2014)	163.7	64.9	9.5
May	205.7	73.1	14.2	May (2013)	211.6	67.8	15.3
June	233.8	59.1	21.0	Jun (2008)	236.5	57.0	20.5
July	230.8	59.4	26.9	Jul (2008)	238.4	59.2	27.6
August	202.5	54.9	25.2	Aug (2008)	211.8	45.8	25.8
September	155.0	38.8	19.5	Sep (2014)	158.4	36.8	20.3
October	114.0	24.5	11.1	Oct (2005)	114.4	31.4	11.6
November	69.8	24.9	3.3	Nov (2014)	70.2	26.2	3.1
December	49.5	21.0	-3.1	Dec (2005)	52.3	20.3	-2.8
Year	1699.2	534.7	10.5	Year	1728.2	508.9	11.0



Overhauled Economic Evaluation

- Fully customizable cost breakdown

- Detailed financing plan

- Includes also self-consumption, storage
- Extended to standalone and pumping systems

- Flexible tariffs

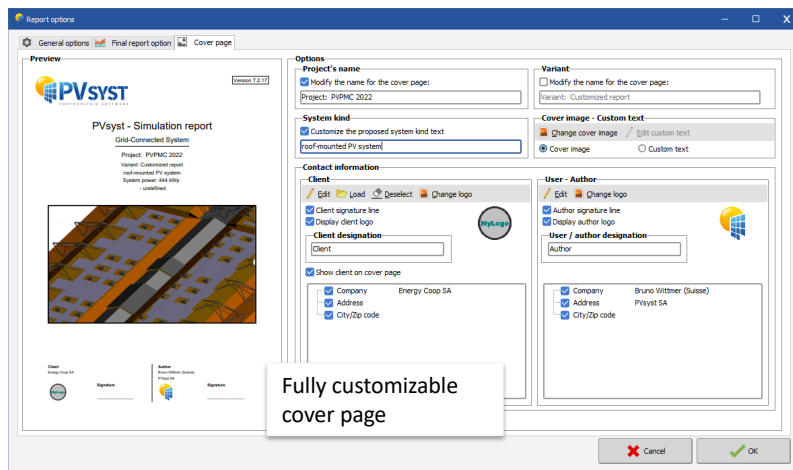
- Detailed results

- Integrated into batch simulations and optimization tool

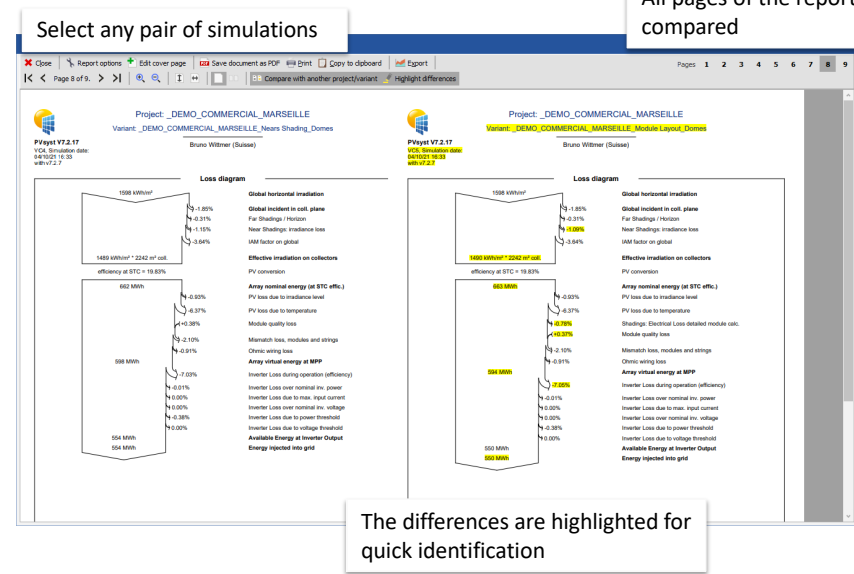


General Improvements of User Interface

- Overhauled report with many possibilities of customization



- Direct comparison of two simulations

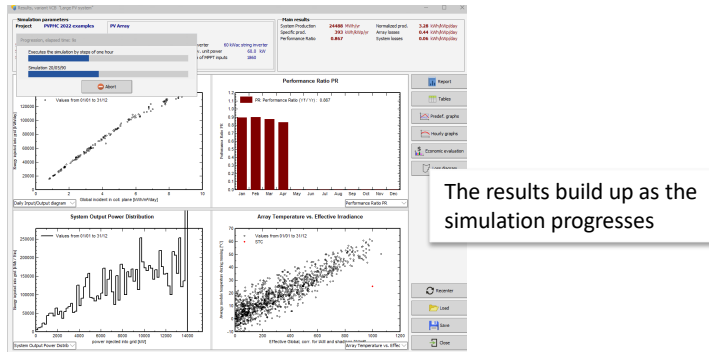


- Renewed look of user interface in release 7.0

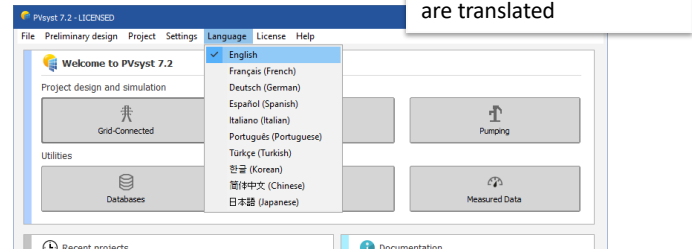


Improvements of User Interface

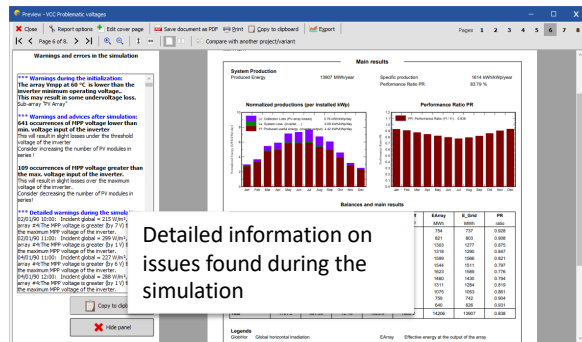
- Direct feedback during simulation



- More Languages

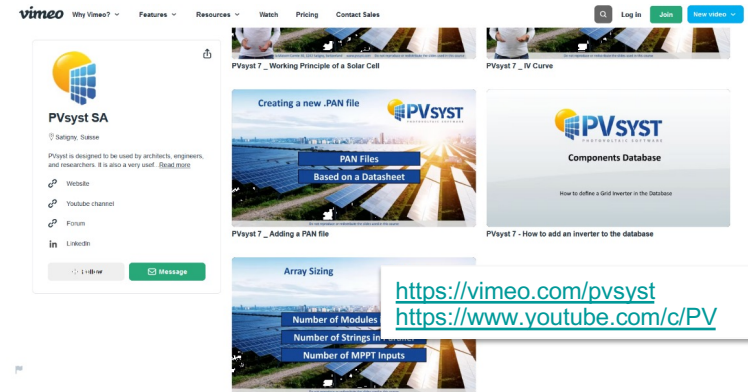


- Issues summary after simulation



Detailed information on issues found during the simulation

- Tutorials on YouTube and Vimeo



Upcoming features

- Single line diagram

in upcoming PVsyst V7.3.0

Editor for single line diagram

Print preview of single line diagram

PV module 1	Mono 440 Wp Twin 144 half-cells
Inverter 1	2000 kWac central inverter
String 1	27 x Mono 440 Wp Twin 144 half-cells

MyLogo

PVPMc_2022_Examples PVsyst DEV

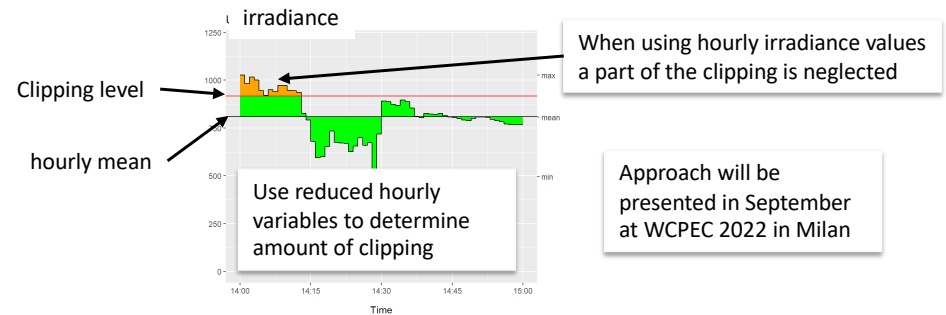
VCT : _Tracker system, 10Mwac_Central inverters, 15/08/22

- System summary and notes

Custom notes can be added to projects and variants, optionally included in report

Detailed summary of the system and possible issues

- Sub-hourly clipping losses



- More flexibility with orientations in a simulation
- Generalized bifacial model



Summary

Many novelties and improvements have accumulated we have briefly shown:

Improvements in modeling

- **PV components**
Detailed modeling of Twin half cell modules
Easier creation of PN files and determination of single diode model parameters
Power optimizers: more manufacturers and improved modeling
- **Transposition**
Explicit treatment of circumsolar irradiance
- **System design**
More detail in AC circuit
Unlimited number of sub-arrays
- **Weather Data**
Updated weather sources
Integrations of APIs for weather data and horizon lines
Tool for the creation of TMY files

Improvements in tools

- **Aging Tool**
multi-year simulations with PV module degradation
- **3D editor**
Importing of drawings including terrain and trackers
Editing of multiple selections
Customization of backtracking
Automatic filling zones
Trackers with common vertical axis (used for floating PV)
Tool to visualize orientations
- **Overhauled Economic Evaluation**
Fully customizable cost breakdown, financing plan and tariffs
Detailed financial analysis
Integration into batch simulations

Improvements in user interface

- Overhauled report
- Direct comparison of two simulations
- More languages
- More details during and after simulation
- More video tutorials

Upcoming features

- Single line diagram
- System summary and notes
- Sub-hourly clipping losses
- More flexibility for complex orientations
- Bifacial systems: current 2D modeling generalized to 3D drawing

