PVSYST
PHOTOVOLTAIC SOFTWARE

PVsyst TRIAL

PVsyst - Simulation report

Pumping PV System

Project: Solar_Water_Pumping_System

Variant: New simulation variant

Pumping PV System

System power: 1480 Wp

Pimpalgaon Raja Road Farm - India

Author

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PVsyst V8.0.7
VC0, Simulation date:
09/03/25 19:12
with V8.0.7

Project summary

Geographical Site
Pimpalgaon Raja Road Farm
India

Situation

Latitude	20.73 °N
Longitude	76.53 °E
Altitude	305 m
Time zone	UTC+5.5

Project settings

Albedo	0.20

Weather data
Pimpalgaon Raja Road Farm
Meteonorm 8.2 (2001-2020), Sat=100% - Synthetic

System summary

Pumping PV System

Deep Well to Storage

Orientation #1
Fixed plane
Tilt/Azimuth 20 / 0 °

Water needs
Yearly constant 10.00 m³/day

System information
PV Array

Nb. of modules	4 units
Pnom total	1480 Wp

Results summary

Water

Water Pumped	3156 m³
Specific	723 m³/kWp/bar
Water needs	3650 m³
Missing Water	13.5 %

Energy

Energy At Pump	1155 kWh
Specific	0.37 kWh/m³
Unused (tank full)	
Unused PV energy	159 kWh
Unused Fraction	6.5 %

Efficiencies

System efficiency	47.5 %
Pump efficiency	23.0 %

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General parameters

Pumping PV System

Deep Well to Storage

System Requirements

Basic Head 27 meterW

Water needs

Yearly constant 10.00 m³/day

Well characteristics

Static level depth	-25 m
Specific drawdown	-2.50 m/m³/h
Diameter	15 cm
Pump level	-35 m
Lower dynamic level	-30 m

Storage tank

Volume	10.0 m³
Diameter	2.0 m
Feeding by top	
Feeding altitude	2.0 m
Height (full level)	3.2 m

Hydraulic circuit

Piping length	50 m
Pipes	PVC Pipe
Dint	44 mm

Orientation #1

Fixed plane	
Tilt/Azimuth	20 / 0 °

PV Array and Pump

PV module

Manufacturer	Generic
Model	Somera VSM.72.370.05
(Original PVsyst database)	
Unit Nom. Power	370 Wp
Number of PV modules	4 units
Nominal (STC)	1480 Wp
Modules	2 string x 2 In series
At operating cond. (50°C)	
Pmpp	1349 Wp
U mpp	71 V
I mpp	19 A
Total PV power	
Nominal (STC)	1.48 kWp
Total	4 modules

Pump

Manufacturer	Generic
Model	SP1A-9/90 VDC Solar
Pump Technology	Centrifugal Multistage
	Deep well pump
Motor	AC motor, triphased
Associated or Integrated converter	
Type	MPPT
Voltage range	75 - 105 V

Operating conditions

	Head min.	Head Nom	Head max.	
	20.0	30.0	40.0	m
Corresp. Flowrate	1.28	1.09	0.86	m³/h
Req. power	400	400	400	W

Number of pumps	
Pumps	2 in parallel

Control device

Model	Generic device (optimised for the system)
System Configuration	MPPT-AC inverter

Pumping system controller

System Operating Control

Generic device params adjusted acc. to the system

Power Conditioning Unit

Type	MPPT-AC inverter
Operating conditions	
Nominal power	840 W
Power Threshold	8 W
Max. efficiency	97.5 %
EURO efficiency	95.5 %
Minimum MPP Voltage	75 V
Maximum MPP Voltage	105 V
Maximum Array Voltage	145 V
Maximum Input Current	9.4 A

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System losses

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 20.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 63 mΩ
Loss Fraction 1.5 % at STC

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 0.5 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

IAM loss factor
Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.402	0.000

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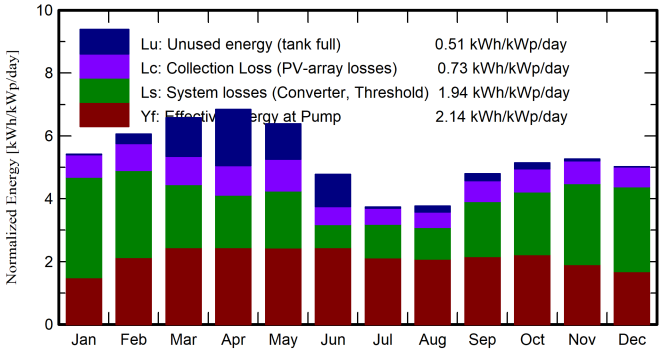
Main results

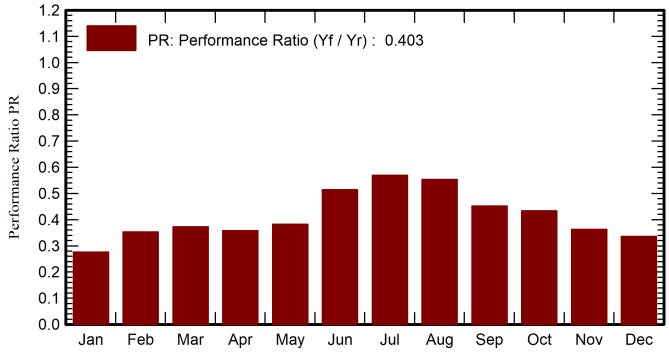
System Production

Water		Energy		Efficiencies	
Water Pumped	3156 m³	Energy At Pump	1155 kWh	System efficiency	47.5 %
Specific	723 m³/kWp/bar	Specific	0.37 kWh/m³	Pump efficiency	23.0 %
Water needs	3650 m³	Unused (tank full)			
Missing Water	13.5 %	Unused PV energy	159 kWh		
		Unused Fraction	6.5 %		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobEff kWh/m²	EArrMPP kWh	E_PmpOp kWh	ETkFull kWh	H_Pump meterW	WPumped m³	W_Used m³	W_Miss m³
January	164.4	215.7	68.8	0.44	30.37	190.3	199.5	110.5
February	165.6	213.7	88.7	8.54	30.47	242.5	235.5	44.5
March	199.0	250.5	112.5	30.84	30.35	307.5	307.5	2.5
April	200.1	247.7	108.9	39.96	30.20	299.9	300.0	0.0
May	192.3	237.1	112.2	27.28	29.88	310.0	310.0	0.0
June	138.0	179.2	109.1	28.86	30.08	299.9	299.8	0.2
July	111.4	148.2	97.7	1.28	29.62	262.4	266.2	43.8
August	112.4	149.7	95.7	6.74	29.68	256.2	253.5	56.5
September	139.6	182.4	96.3	7.21	29.89	258.6	263.4	36.6
October	155.2	201.0	102.3	5.65	30.36	281.9	281.1	28.9
November	154.0	201.5	84.9	1.85	30.31	234.2	234.7	65.3
December	152.0	201.5	77.5	0.07	30.16	212.4	209.6	100.4
Year	1884.0	2428.1	1154.5	158.74	30.08	3156.0	3160.8	489.2

Legends

GlobEff	Effective Global, corr. for IAM and shadings
EArrMPP	Array virtual energy at MPP
E_PmpOp	Pump operating energy
ETkFull	Unused energy (tank full)
H_Pump	Average total Head at pump
WPumped	Water volume pumped
W_Used	Water drawn by the user
W_Miss	Missing water

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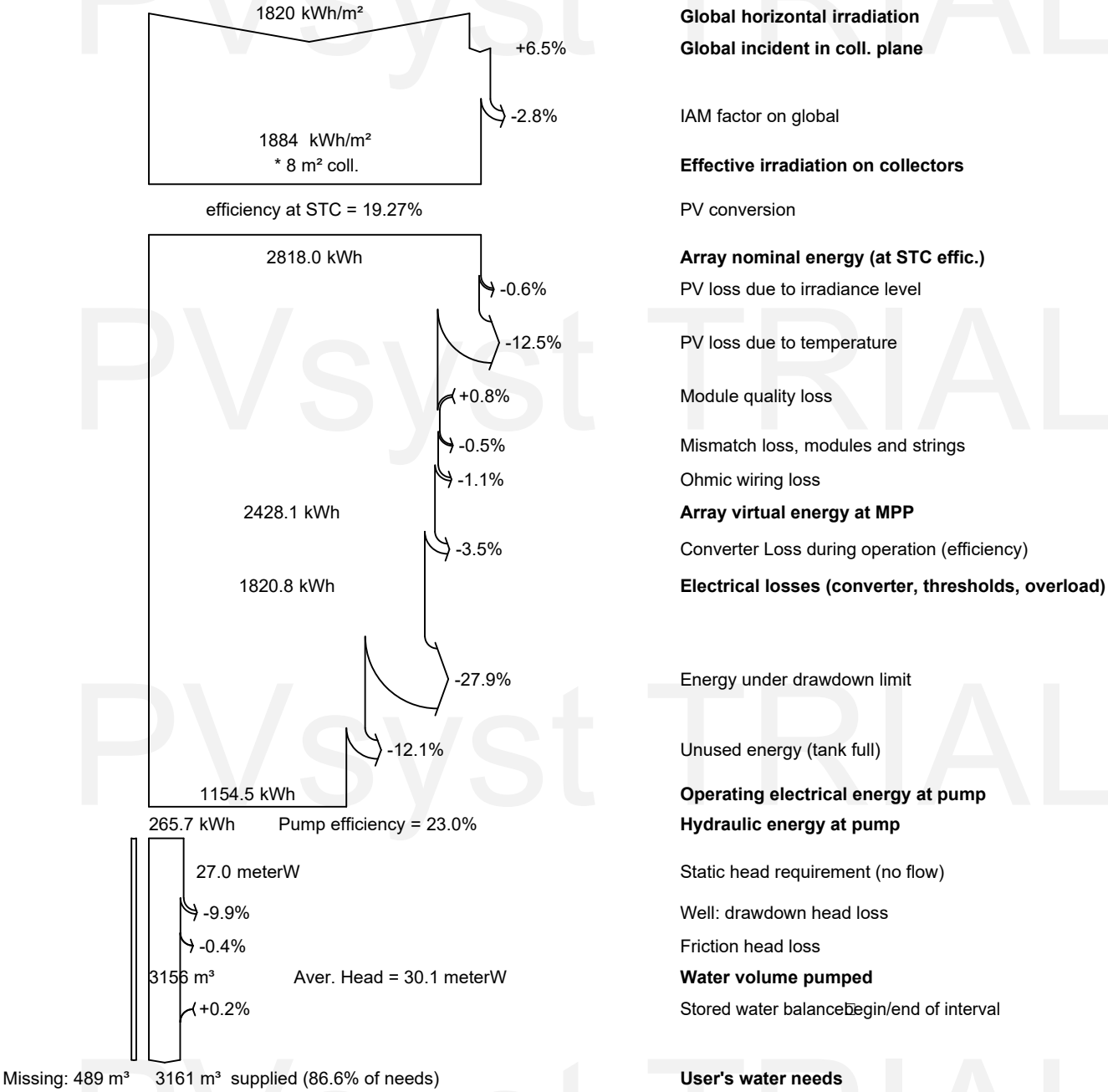
Loss diagram



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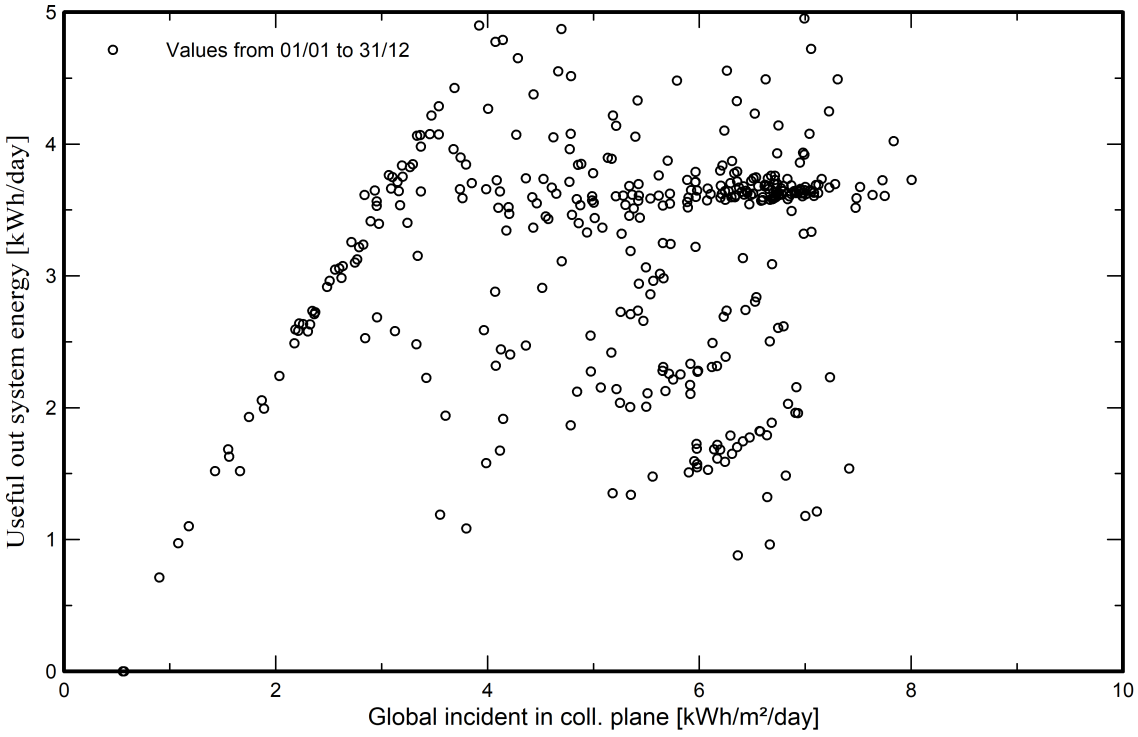
Predef. graphs

Daily Input/Output diagram



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