Version 7.4.8

PVsyst - Simulation report

Grid-Connected System

Project: Pabrik Karton

Variant: P-Type V5

Tables on a building

System power: 380 kWp

Pabrik Karton - Indonesia

Januar Sahrul

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Project summary

Geographical Site
Pabrik Karton
Indonesia

Situation

Latitude	-6.19 °S
Longitude	106.55 °E
Altitude	16 m
Time zone	UTC+7

Project settings
Albedo 0.20

Weather data
Pabrik Karton
Meteonorm 8.1 (2016-2021), Sat=100% - Synthetic

System summary

Grid-Connected System
Simulation for year no 1

Tables on a building

PV Field Orientation

Fixed planes	2 orientations
Tilts/azimuths	15 / 90 ° 15 / -90 °

Near Shadings
Linear shadings : Fast (table)

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	684 units
Pnom total	380 kWp

Inverters

Nb. of units	3 units
Pnom total	300 kWac
Pnom ratio	1.265

Results summary

Produced Energy	523448 kWh/year	Specific production	1379 kWh/kWp/year	Perf. Ratio PR	78.55 %

Table of contents

PVsyst V7.4.8
VCE, Simulation date:
29/01/25 23:57
with V7.4.8

General parameters

Grid-Connected System

Tables on a building

PV Field Orientation

Orientation		Sheds configuration		Models used	
Fixed planes	2 orientations	Nb. of sheds	684 units	Transposition	Perez
Tilts/azimuths	15 / 90 ° 15 / -90 °	Several orientations		Diffuse	Perez, Meteonorm
				Circumsolar	separate

Horizon
Free Horizon

Near Shadings
Linear shadings : Fast (table)

User's needs
Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Trina Solar
Model	TSM-DE19-555Wp Vertex
(Original PVsyst database)	
Unit Nom. Power	555 Wp
Number of PV modules	684 units
Nominal (STC)	380 kWp

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-100KTL-M2-400V
(Custom parameters definition)	
Unit Nom. Power	100 kWac
Number of inverters	3 units
Total power	300 kWac

Array #1 - 1A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #2 - 2A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #3 - 3A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

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VCE, Simulation date:
29/01/25 23:57
with V7.4.8

PV Array Characteristics

Array #4 - 4A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #5 - 5A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	23 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.77 kWp	Total power	10.0 kWac
Modules	1 strings x 23 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.68 kWp	Max. power (=>33°C)	110 kWac
U mpp	663 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #6 - 6A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #7 - 7A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #8 - 8A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

PV Array Characteristics

Array #9 - 9A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #10 - 10A

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #11 - 1B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #12 - 2B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #13 - 3B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

PV Array Characteristics

Array #14 - 4B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #15 - 5B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	23 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.77 kWp	Total power	10.0 kWac
Modules	1 strings x 23 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.68 kWp	Max. power (=>33°C)	110 kWac
U mpp	663 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #16 - 6B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #17 - 7B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #18 - 8B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

PV Array Characteristics

Array #19 - 9B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.5 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #20 - 10B

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	24 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	13.32 kWp	Total power	10.4 kWac
Modules	1 strings x 24 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	12.19 kWp	Max. power (=>33°C)	110 kWac
U mpp	691 V	Pnom ratio (DC:AC)	1.28
I mpp	18 A		

Array #21 - 1C

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #22 - 2C

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #23 - 3C

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

PV Array Characteristics

Array #24 - 4C

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #25 - 5C

Orientation	#1		
Tilt/Azimuth	15/90 °		
Number of PV modules	23 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.77 kWp	Total power	10.4 kWac
Modules	1 strings x 23 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.68 kWp	Max. power (=>33°C)	110 kWac
U mpp	663 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #26 - 6C

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #27 - 7C

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #28 - 8C

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

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VCE, Simulation date:
29/01/25 23:57
with V7.4.8

PV Array Characteristics

Array #29 - 9C

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	22 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.21 kWp	Total power	9.9 kWac
Modules	1 strings x 22 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.17 kWp	Max. power (=>33°C)	110 kWac
U mpp	634 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Array #30 - 10C

Orientation	#2		
Tilt/Azimuth	15/-90 °		
Number of PV modules	23 units	Number of inverters	1 * MPPT 10% 0.1 unit
Nominal (STC)	12.77 kWp	Total power	10.4 kWac
Modules	1 strings x 23 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	11.68 kWp	Max. power (=>33°C)	110 kWac
U mpp	663 V	Pnom ratio (DC:AC)	1.23
I mpp	18 A		

Total PV power		**Total inverter power**	
Nominal (STC)	380 kWp	Total power	300 kWac
Total	684 modules	Nb. of inverters	3 units
Module area	1787 m²		0.0 unused
		Pnom ratio	1.27
		Power sharing defined	

Array losses

Array Soiling Losses
Loss Fraction 3.0 %

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 15.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

LID - Light Induced Degradation
Loss Fraction 1.8 %

Module Quality Loss
Loss Fraction 0.0 %

Module mismatch losses
Loss Fraction 0.2 % at MPP

Strings Mismatch loss
Loss Fraction 0.2 %

Module average degradation
Year no 1
Loss factor 0.62 %/year

Mismatch due to degradation
Imp RMS dispersion 0.4 %/year
Vmp RMS dispersion 0.4 %/year

IAM loss factor
Incidence effect (IAM): Fresnel, AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

Array losses

Spectral correction

FirstSolar model

Precipitable water estimated from relative humidity

Coefficient Set	C0	C1	C2	C3	C4	C5
Monocrystalline Si	0,85914	-0,02088	-0,0058853	0,12029	0,026814	-0,001781

DC wiring losses

Global wiring resistance 10 mΩ
Loss Fraction 1.4 % at STC

Array #1 - 1A
Global array res. 721 mΩ
Loss Fraction 1.7 % at STC

Array #2 - 2A
Global array res. 727 mΩ
Loss Fraction 1.7 % at STC

Array #3 - 3A
Global array res. 683 mΩ
Loss Fraction 1.6 % at STC

Array #4 - 4A
Global array res. 645 mΩ
Loss Fraction 1.5 % at STC

Array #5 - 5A
Global array res. 602 mΩ
Loss Fraction 1.5 % at STC

Array #6 - 6A
Global array res. 539 mΩ
Loss Fraction 1.4 % at STC

Array #7 - 7A
Global array res. 495 mΩ
Loss Fraction 1.3 % at STC

Array #8 - 8A
Global array res. 595 mΩ
Loss Fraction 1.5 % at STC

Array #9 - 9A
Global array res. 658 mΩ
Loss Fraction 1.7 % at STC

Array #10 - 10A
Global array res. 501 mΩ
Loss Fraction 1.2 % at STC

Array #11 - 1B
Global array res. 721 mΩ
Loss Fraction 1.7 % at STC

Array #12 - 2B
Global array res. 727 mΩ
Loss Fraction 1.7 % at STC

Array #13 - 3B
Global array res. 683 mΩ
Loss Fraction 1.6 % at STC

Array #14 - 4B
Global array res. 645 mΩ
Loss Fraction 1.5 % at STC

Array #15 - 5B
Global array res. 602 mΩ
Loss Fraction 1.5 % at STC

Array #16 - 6B
Global array res. 539 mΩ
Loss Fraction 1.4 % at STC

Array #17 - 7B
Global array res. 495 mΩ
Loss Fraction 1.3 % at STC

Array #18 - 8B
Global array res. 595 mΩ
Loss Fraction 1.5 % at STC

Array #19 - 9B
Global array res. 658 mΩ
Loss Fraction 1.7 % at STC

Array #20 - 10B
Global array res. 501 mΩ
Loss Fraction 1.2 % at STC

Array #21 - 1C
Global array res. 389 mΩ
Loss Fraction 1.0 % at STC

Array #22 - 2C
Global array res. 457 mΩ
Loss Fraction 1.2 % at STC

Array #23 - 3C
Global array res. 520 mΩ
Loss Fraction 1.3 % at STC

Array #24 - 4C
Global array res. 476 mΩ
Loss Fraction 1.2 % at STC

Array #25 - 5C
Global array res. 483 mΩ
Loss Fraction 1.2 % at STC

Array #26 - 6C
Global array res. 389 mΩ
Loss Fraction 1.0 % at STC

Array #27 - 7C
Global array res. 457 mΩ
Loss Fraction 1.2 % at STC

Array #28 - 8C
Global array res. 520 mΩ
Loss Fraction 1.3 % at STC

PVsyst V7.4.8
VCE, Simulation date:
29/01/25 23:57
with V7.4.8

DC wiring losses

Array #29 - 9C		**Array #30 - 10C**	
Global array res.	476 mΩ	Global array res.	483 mΩ
Loss Fraction	1.2 % at STC	Loss Fraction	1.2 % at STC

AC wiring losses

Inv. output line up to injection point

Inverter voltage	400 Vac tri
Loss Fraction	0.22 % at STC

Global System

Wire section	Copper 3 x 400 mm²
Wires length	20 m

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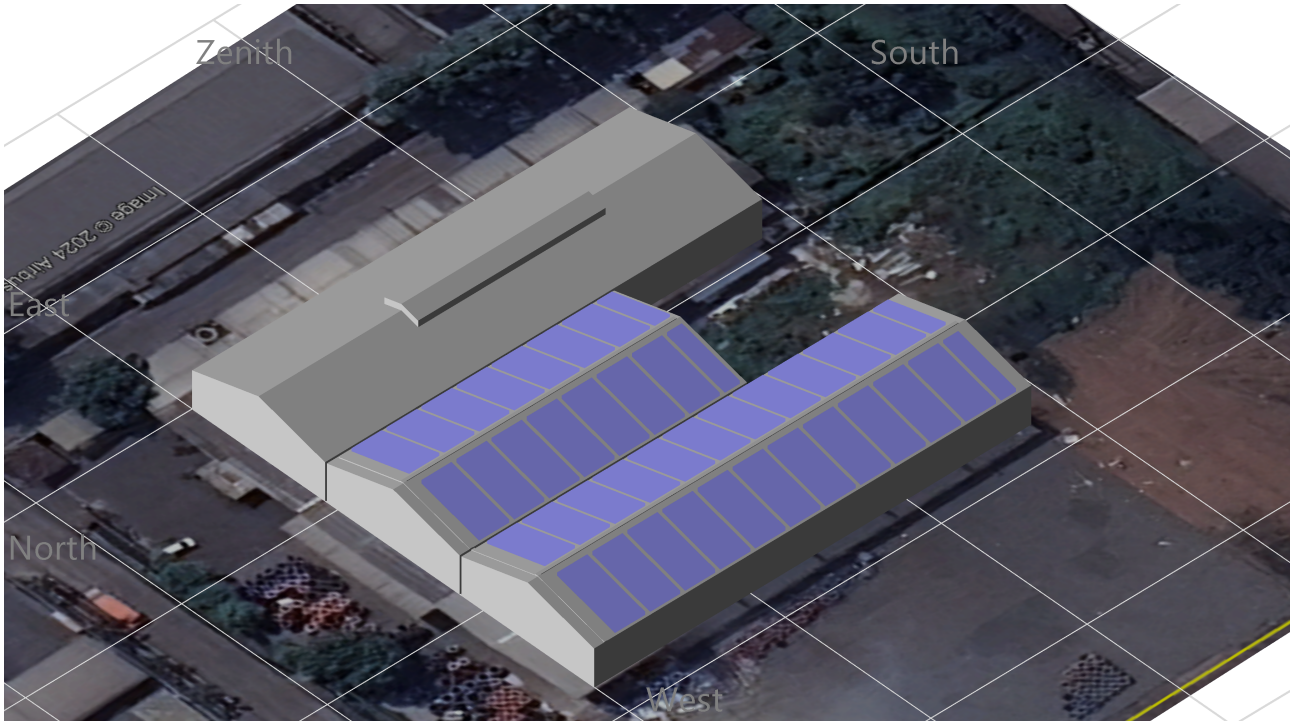
VCE, Simulation date:
29/01/25 23:57
with V7.4.8

Near shadings parameter

Perspective of the PV-field and surrounding shading scene



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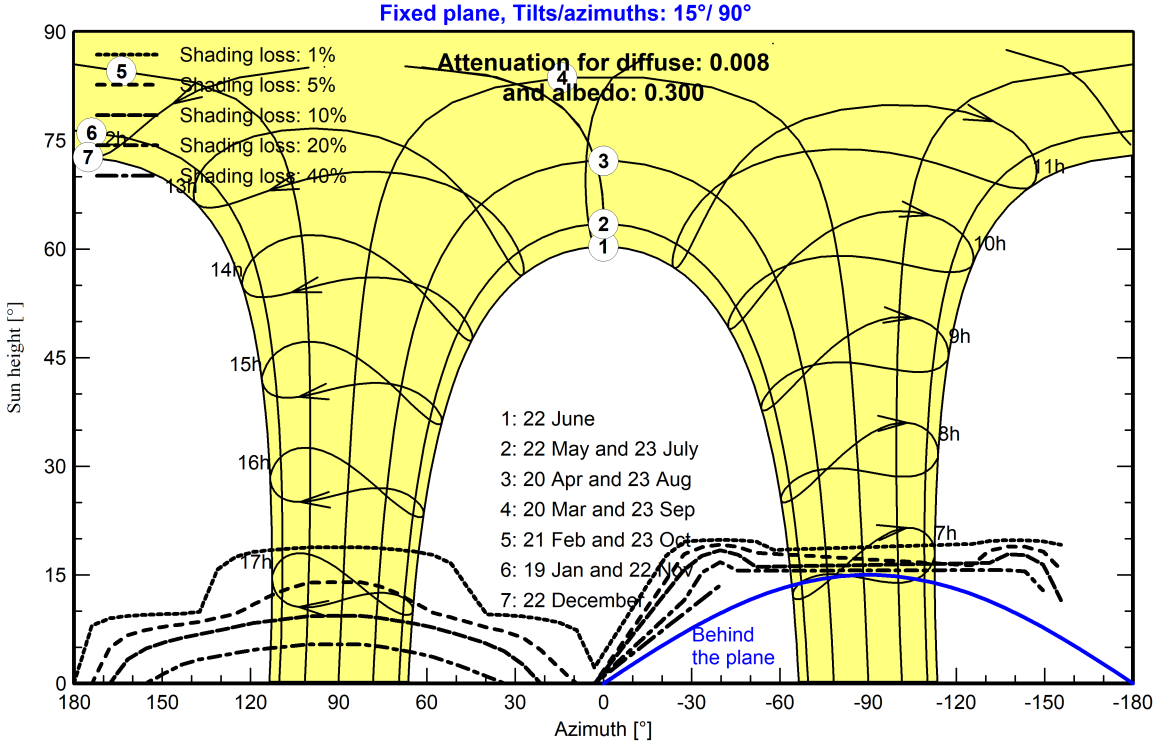
Iso-shadings diagram

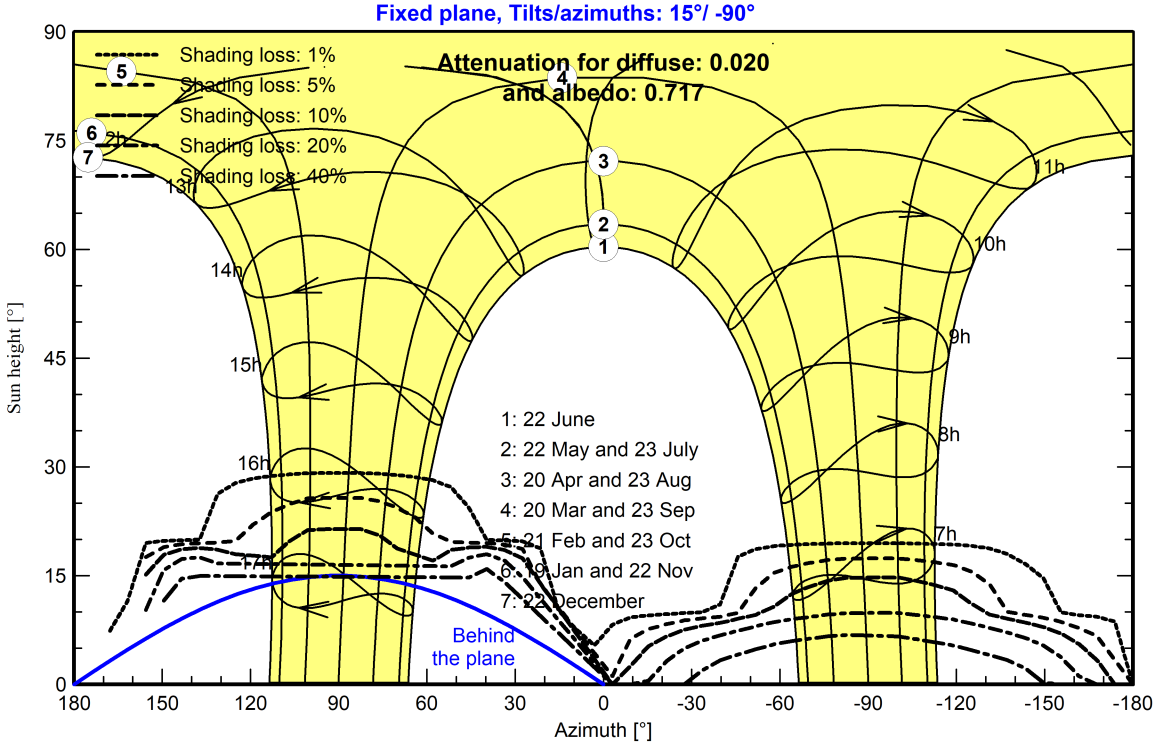
Orientation #1

Fixed plane, Tilts/azimuths: 15°/ 90°



Orientation #2

Fixed plane, Tilts/azimuths: 15°/ -90°



PVsyst V7.4.8
VCE, Simulation date:
29/01/25 23:57
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Main results

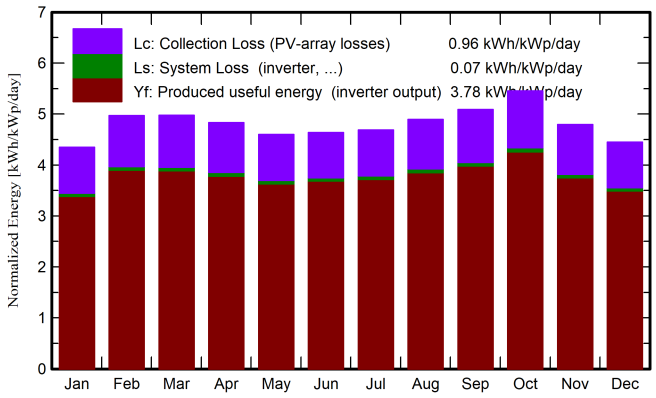
System Production

Produced Energy	523448 kWh/year	Specific production	1379 kWh/kWp/year
		Perf. Ratio PR	78.55 %

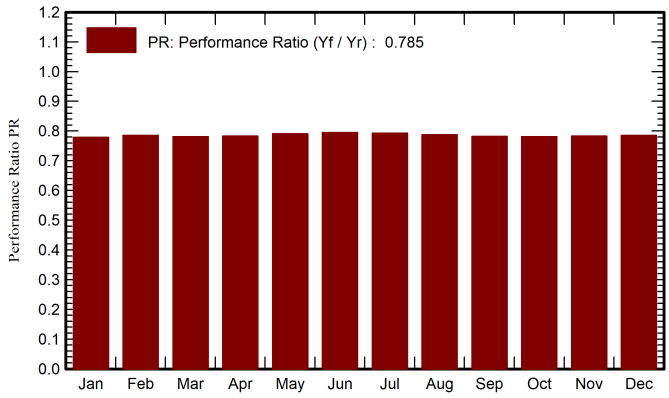
Economic evaluation

Investment		Yearly cost		LCOE	
Global	2.457.873.351.65 IDR	Annuities	0.00 IDR/yr	Energy cost	682 IDR/kWh
Specific	6475 IDR/Wp	Run. costs	233.738.669.25 IDR/yr		
		Payback period	6.4 years		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR ratio
January	137.0	71.3	26.56	134.7	126.3	40612	39856	0.779
February	141.7	80.5	26.51	139.2	130.9	42251	41479	0.785
March	157.1	85.7	26.88	154.3	145.2	46605	45745	0.781
April	147.6	76.0	26.82	145.1	136.3	43914	43109	0.783
May	145.1	77.5	27.28	142.6	133.7	43541	42773	0.790
June	141.6	69.8	26.66	139.1	130.7	42755	41997	0.795
July	148.1	71.9	26.51	145.4	136.6	44574	43781	0.793
August	154.6	81.1	26.83	151.8	143.1	46196	45361	0.787
September	155.5	86.4	26.72	152.7	143.8	46194	45355	0.782
October	172.4	100.1	27.40	169.1	159.4	51071	50146	0.781
November	146.7	83.9	26.76	143.8	135.4	43533	42737	0.783
December	140.4	81.6	26.80	137.9	129.4	41866	41108	0.786
Year	1787.9	965.7	26.81	1755.5	1650.9	533113	523448	0.785

Legends

GlobHor	Global horizontal irradiation
DiffHor	Horizontal diffuse irradiation
T_Amb	Ambient Temperature
GlobInc	Global incident in coll. plane
GlobEff	Effective Global, corr. for IAM and shadings
EArray	Effective energy at the output of the array
E_Grid	Energy injected into grid
PR	Performance Ratio

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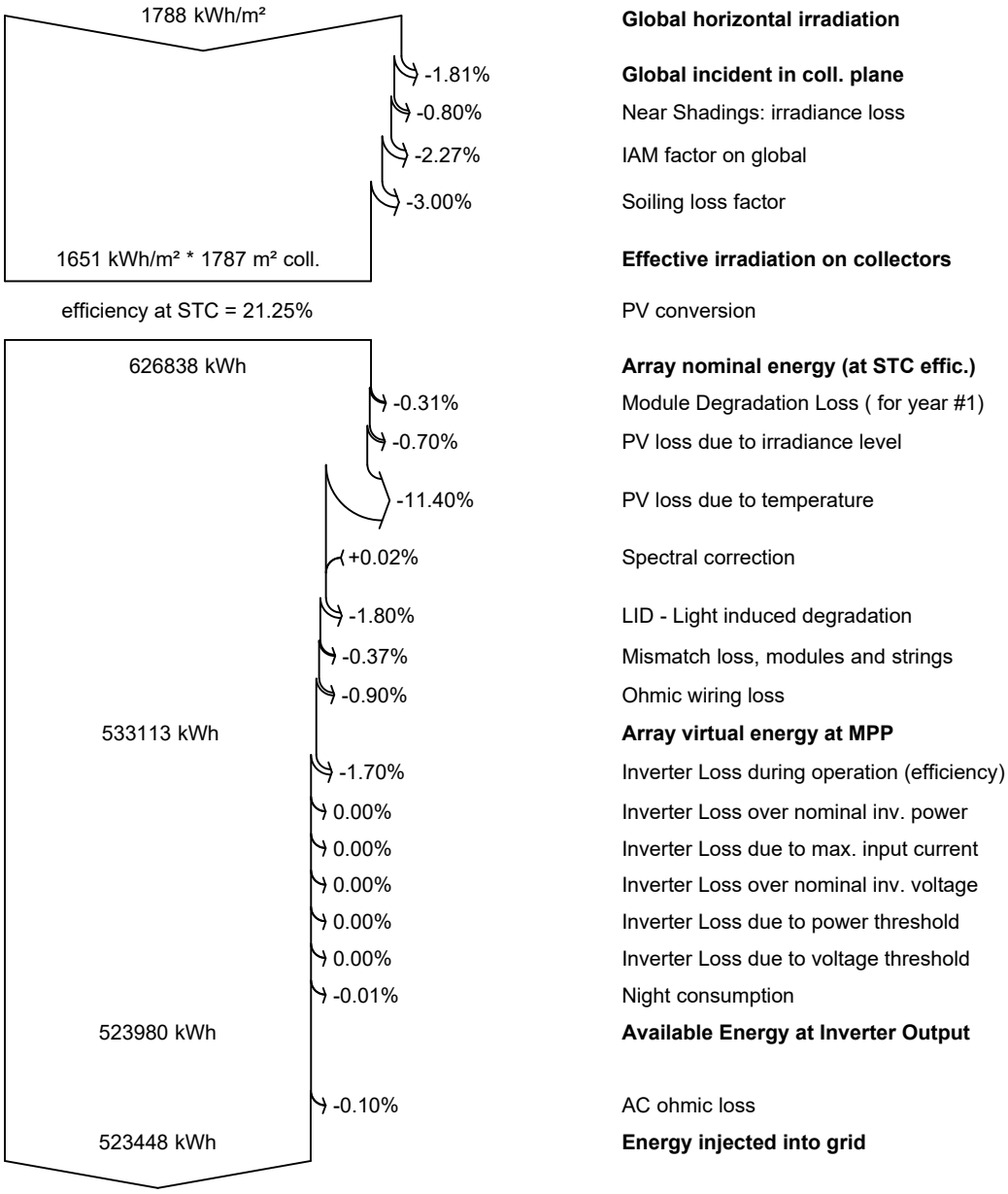
Loss diagram



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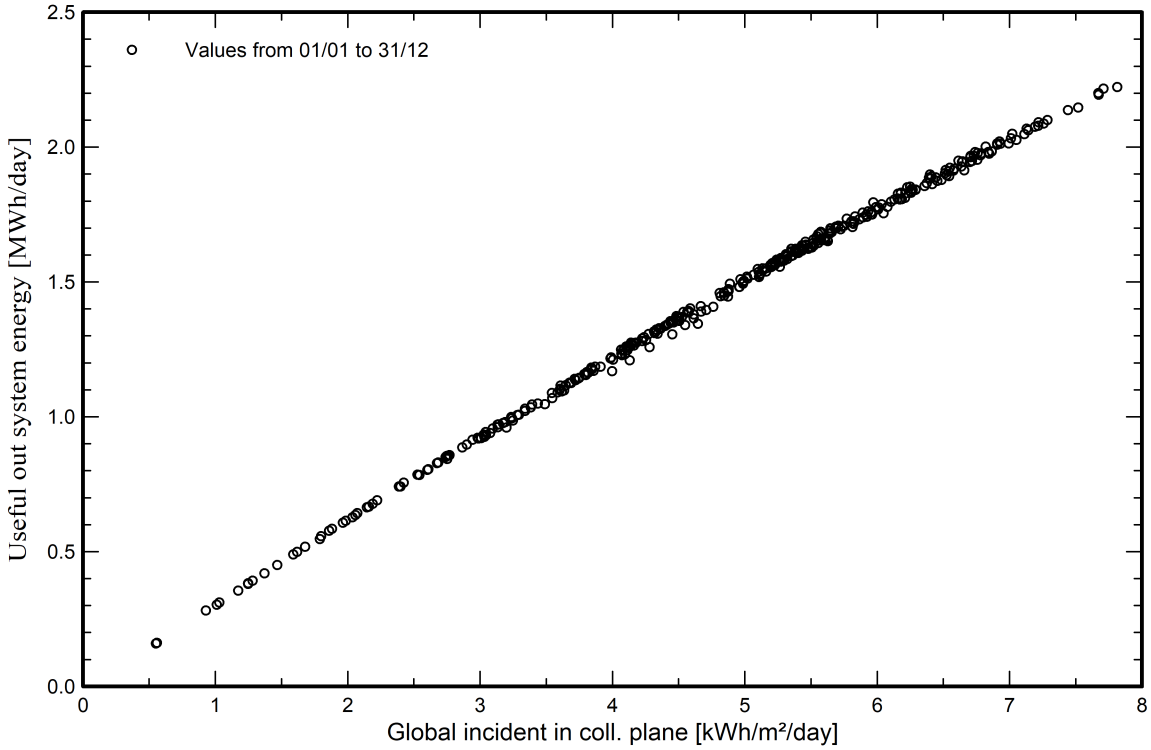
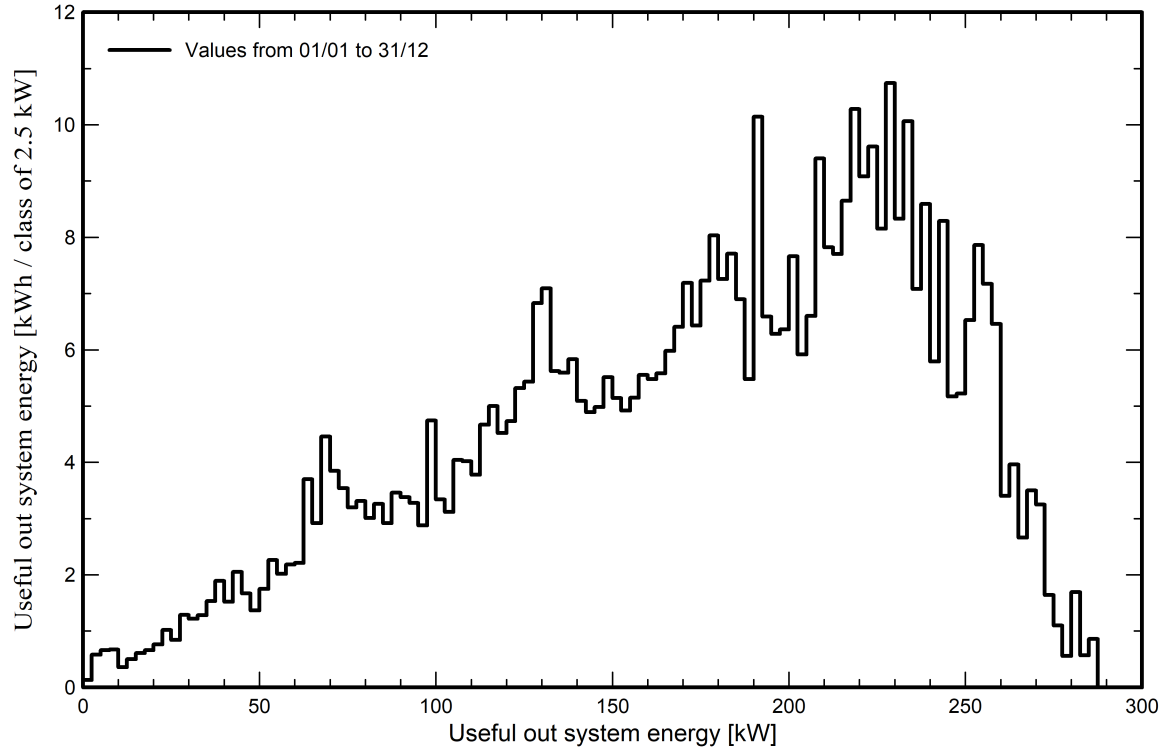
Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



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Cost of the system

Installation costs

Item	Quantity units	Cost IDR	Total IDR
PV modules			
TSM-DE19-555Wp Vertex	684	1.272.844.23	870.625.450.00
Supports for modules	684	269.809.26	184.549.536.00
Inverters			
SUN2000-100KTL-M2-400V	3	67.900.000.00	203.700.000.00
Other components			
Solar Cable	1	92.306.000.00	92.306.000.00
Komponen Lainnya	1	683.217.533.00	683.217.533.00
Studies and analysis			
Engineering	1	29.230.740.00	29.230.740.00
Installation			
Project Management	684	139.856.20	95.661.640.00
Heavy Machinery	1	62.500.000.00	62.500.000.00
Taxes			
VAT	1	0.00	236.082.452.65
		Total	2.457.873.351.65
		Depreciable asset	2.034.398.519.00

Operating costs

Item	Total IDR/year
Maintenance	
Provision for inverter replacement	40.740.000.00
Pest Management	33.945.77
System Inspection and Monitoring	12.114.058.57
Cleaning	37.249.490.78
Component Part Replacement	965.981.67
Asset Management & Security	4.091.416.35
Operation Adiministration	6.535.885.62
Module Replacement	1.935.996.27
Administrative, accounting	26.672.621.00
Total (OPEX)	130.339.396.03
Including inflation (3.75%)	233.738.669.25

System summary

Total installation cost	2.457.873.351.65 IDR
Operating costs (incl. inflation 3.75%/year)	233.738.669.25 IDR/year
Produced Energy	523 MWh/year
Cost of produced energy (LCOE)	682.4747 IDR/kWh

PVsyst V7.4.8
VCE, Simulation date:
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with V7.4.8

Financial analysis

Simulation period

Project lifetime	30 years	Start year	2025

Income variation over time

Inflation	3.75 %/year
Production variation (aging)	Aging tool results
Discount rate	0.00 %/year

Income dependent expenses

Income tax rate	0.00 %/year
Other income tax	0.00 %/year
Dividends	0.00 %/year

Depreciable assets

Asset	Depreciation method	Depreciation period (years)	Salvage value (IDR)	Depreciable (IDR)
TSM-DE19-555Wp Vertex	Straight-line	30	0.00	870.625.450.00
Supports for modules	Straight-line	30	0.00	184.549.536.00
SUN2000-100KTL-M2-400V	Straight-line	30	0.00	203.700.000.00
Solar Cable	Straight-line	30	0.00	92.306.000.00
Komponen Lainnya	Straight-line	30	0.00	683.217.533.00
		Total	0.00	2.034.398.519.00

Financing

Own funds	2.457.873.351.65 IDR

Electricity sale

Feed-in tariff	1.035.78000 IDR/kWh
Duration of tariff warranty	20 years
Annual connection tax	0.00 IDR/kWh
Annual tariff variation	0.0 %/year
Feed-in tariff decrease after warranty	0.00 %

Return on investment

Payback period	6.4 years
Net present value (NPV)	4.902.472.079.36 IDR
Internal rate of return (IRR)	13.52 %
Return on investment (ROI)	199.5 %

Financial analysis

Detailed economic results (kIDR)

Year	Electricity sale	Own funds	Run. costs	Deprec. allow.	Taxable income	Taxes	After-tax profit	Cumul. profit	% amorti.
0	0	2.457.873.352	0	0	0	0	0	-2.457.873.352	0.0%
1	540.075.493	0	130.339.396	67.813.284	341.922.813	0	409.736.097	-2.048.137.255	16.7%
2	535.778.266	0	135.227.123	67.813.284	332.737.858	0	400.551.142	-1.647.586.113	33.0%
3	531.481.038	0	140.298.141	67.813.284	323.369.614	0	391.182.898	-1.256.403.215	48.9%
4	527.183.811	0	145.559.321	67.813.284	313.811.207	0	381.624.491	-874.778.724	64.4%
5	522.886.584	0	151.017.795	67.813.284	304.055.505	0	371.868.789	-502.909.935	79.5%
6	518.589.357	0	156.680.963	67.813.284	294.095.111	0	361.908.395	-141.001.540	94.3%
7	514.292.130	0	162.556.499	67.813.284	283.922.348	0	351.735.632	210.734.091	108.6%
8	509.994.903	0	168.652.367	67.813.284	273.529.252	0	341.342.536	552.076.627	122.5%
9	505.697.676	0	174.976.831	67.813.284	262.907.561	0	330.720.845	882.797.472	135.9%
10	501.400.449	0	181.538.462	67.813.284	252.048.703	0	319.861.987	1.202.659.459	148.9%
11	497.103.222	0	188.346.155	67.813.284	240.943.784	0	308.757.068	1.511.416.527	161.5%
12	493.459.174	0	195.409.136	67.813.284	230.236.754	0	298.050.038	1.809.466.565	173.6%
13	489.815.125	0	202.736.978	67.813.284	219.264.863	0	287.078.147	2.096.544.712	185.3%
14	486.171.077	0	210.339.615	67.813.284	208.018.178	0	275.831.462	2.372.376.174	196.5%
15	482.527.028	0	218.227.350	67.813.284	196.486.394	0	264.299.678	2.636.675.852	207.3%
16	478.882.980	0	226.410.876	67.813.284	184.658.820	0	252.472.104	2.889.147.956	217.5%
17	475.238.931	0	234.901.284	67.813.284	172.524.363	0	240.337.647	3.129.485.603	227.3%
18	471.594.883	0	243.710.082	67.813.284	160.071.517	0	227.884.801	3.357.370.404	236.6%
19	467.950.834	0	252.849.210	67.813.284	147.288.340	0	215.101.624	3.572.472.028	245.3%
20	464.306.786	0	262.331.055	67.813.284	134.162.446	0	201.975.730	3.774.447.758	253.6%
21	460.662.737	0	272.168.470	67.813.284	120.680.983	0	188.494.267	3.962.942.025	261.2%
22	455.139.368	0	282.374.788	67.813.284	104.951.296	0	172.764.580	4.135.706.605	268.3%
23	449.615.999	0	292.963.842	67.813.284	88.838.873	0	156.652.157	4.292.358.762	274.6%
24	444.092.630	0	303.949.986	67.813.284	72.329.359	0	140.142.643	4.432.501.406	280.3%
25	438.569.261	0	315.348.111	67.813.284	55.407.866	0	123.221.150	4.555.722.555	285.4%
26	433.045.891	0	327.173.665	67.813.284	38.058.943	0	105.872.227	4.661.594.782	289.7%
27	427.522.522	0	339.442.677	67.813.284	20.266.561	0	88.079.845	4.749.674.627	293.2%
28	421.999.153	0	352.171.778	67.813.284	2.014.091	0	69.827.375	4.819.502.002	296.1%
29	416.475.784	0	365.378.219	67.813.284	0	0	51.097.565	4.870.599.567	298.2%
30	410.952.415	0	379.079.903	67.813.284	0	0	31.872.512	4.902.472.079	299.5%
Total	**14.372.505.509**	**2.457.873.352**	**7.012.160.078**	**2.034.398.519**	**5.378.603.403**	**0**	**7.360.345.431**	**4.902.472.079**	**299.5%**

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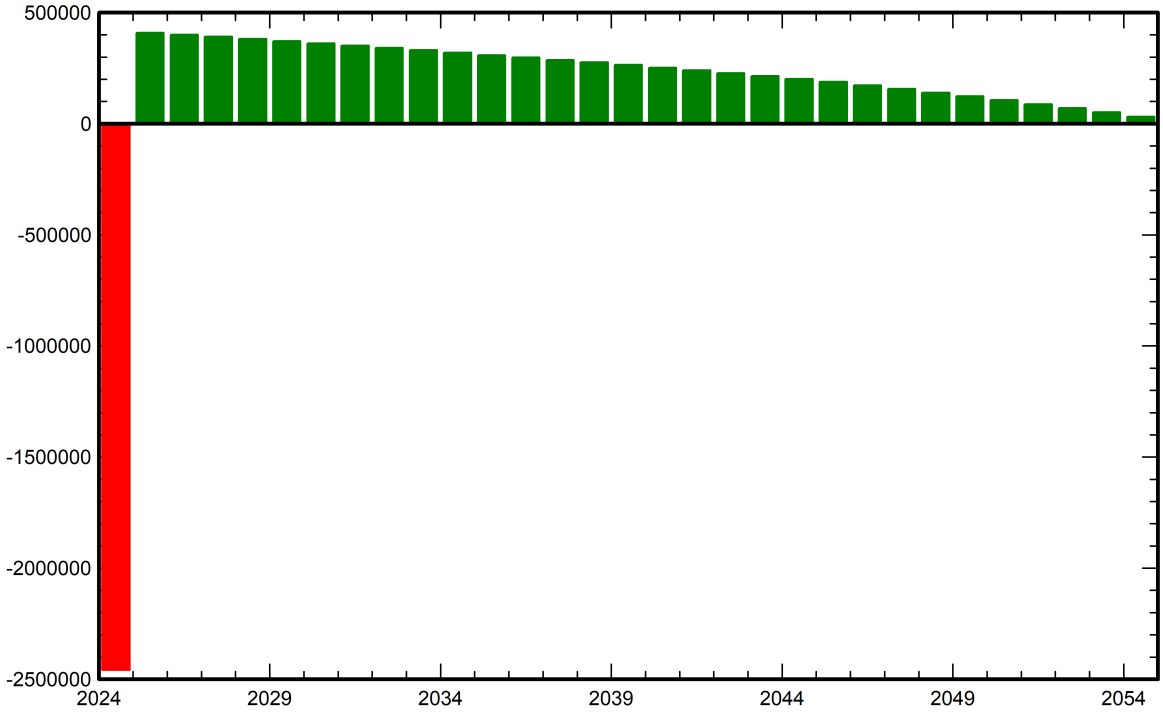
Financial analysis

Yearly net profit (kIDR)



Cumulative cashflow (kIDR)