



AGROVOLTAICO VITERBO - COMUNE DI VITERBO

PROGETTO DEFINITIVO

Autorizzazione Unica ai sensi del D.Lgs. 387/2003 per un impianto agrovoltaiico di superficie pari a 107,38 ha costituito da coltivazioni di patata novella, asparago, cavolo a foglia e erbai integrate ad un impianto fotovoltaico con tracker monoassiali (60 MWp) sito in loc. Vaccareccia nel Comune di Viterbo (VT)

CODICE ELABORATO:

R.4

TITOLO ELABORATO:

Relazione tecnica producibilità impianti fotovoltaici

SCALA:

-

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PROPONENTE:

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Diego Garfias

PROGETTISTA:



We support the Sustainable Development Goals



CERTIFIED ISO 9001, ISO 14001, ISO 50001

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REV.	DATA	STATO	PREPARATO	RIESAMINATO	APPROVATO
00	15-01-2024	PRIMA EMISSIONE	Fio. CASTELLANI	Fra. CASTELLANI	F. SANTI

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1 PREMESSA

La presente relazione tecnica descrive la producibilità dell'impianto agrovoltico da realizzare in località Vaccareccia nel Comune di Viterbo (VT) con connessione a 36 kV alla RTN presso la SE Grotte Santo Stefano nel Comune di Viterbo (VT).

La titolarità dell'impianto è della Apollo Viterbo srl, società con sede in Via della Stazione n. 8, Bolzano (BZ), 39100, C.F. e P.Iva 03231580212 .

2 DESCRIZIONE DELL'IMPIANTO

L'impianto sarà costituito da n. 87.696 moduli fotovoltaici con potenza nominale 690 Wp installati su inseguitori monoassiali, che ospiteranno 1/2, 1 o 2 stringhe, composte da 28 moduli, ognuno al fine di eliminare le perdite connesse ad eventuale diverso orientamento degli stessi.

L'impianto avrà potenza complessiva installata di 60 MWp con potenza massima di immissione di 57 MWp.

L'impianto sarà suddiviso in 8 sezioni, corrispondenti ad altrettanti anelli aperti a 36 kV, collegati nel totale a 285 inverter da 200 kW e 33 trasformatori 0,8 kV / 36 kV.

L'impianto sarà realizzato a terra e localizzato nel Comune di Viterbo (VT) alle seguenti coordinate.

Latitudine	42° 24'13.54"N
Longitudine	12° 02'18.88"E
Quota media s.l.m.	230 m

L'impianto sarà collegato alla RTN tramite la SE Grotte Santo Stefano direttamente a 36 kV attraverso un cavidotto.

3 REPORT PVSYST

PVsyst - Simulation report

Grid-Connected System

Project: RP GLOBAL PV

Variant: -38 to +38

Tracking system with backtracking

System power: 60.51 MWp

Capodiferro - Italy

Author

Studio Santi srl (Italy)



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Project summary

Geographical Site		Situation		Project settings	
Capodiferro		Latitude	42.40 °N	Albedo	0.20
Italy		Longitude	12.02 °E		
		Altitude	187 m		
		Time zone	UTC+1		
Meteo data					
Capodiferro					
Meteonorm 8.1 (1991-2014), Sat=21% - Synthetic					

System summary

Grid-Connected System		Tracking system with backtracking			
PV Field Orientation		Tracking algorithm		Near Shadings	
Orientation		Astronomic calculation		Linear shadings : Fast (table)	
Tracking plane, tilted axis		Backtracking activated		Diffuse shading Automatic	
Avg axis tilt	0.9 °				
Avg axis azim.	0 °				
System information					
PV Array					
Nb. of modules	87696 units	Inverters		Nb. of units 285 units	
Pnom total	60.51 MWp			Pnom total 57.00 MWac	
				Pnom ratio 1.062	
User's needs					
Unlimited load (grid)					

Results summary

Produced Energy	109133423 kWh/year	Specific production	1804 kWh/kWp/year	Perf. Ratio PR	91.53 %
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General parameters

Grid-Connected System

PV Field Orientation

Orientation

Tracking plane, tilted axis
Avg axis tilt 0.9 °
Avg axis azim. 0 °

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Bifacial system

Model 2D Calculation
unlimited trackers

Bifacial model geometry

Tracker Spacing 5.50 m
Tracker width 2.38 m
GCR 43.3 %
Axis height above ground 3.00 m

Tracking system with backtracking

Tracking algorithm

Astronomic calculation
Backtracking activated

Near Shadings

Linear shadings : Fast (table)
Diffuse shading Automatic

Backtracking array

Nb. of trackers 2748 units

Sizes

Tracker Spacing 5.50 m
Collector width 2.38 m
Ground Cov. Ratio (GCR) 43.3 %
Phi min / max. -/+ 38.0 °

Backtracking strategy

Phi limits for BT -/+ 64.1 °
Backtracking pitch 5.43 m
Backtracking width 2.38 m
Mode Automatic

User's needs

Unlimited load (grid)

Bifacial model definitions

Ground albedo 0.20
Bifaciality factor 80 %
Rear shading factor 5.0 %
Rear mismatch loss 10.0 %
Shed transparent fraction 0.0 %

PV Array Characteristics

PV module

Manufacturer Canadian Solar
Model Canadian- TOPBiHiKu7- CS7N-690TB-AG
(Custom parameters definition)
Unit Nom. Power 690 Wp
Number of PV modules 87696 units
Nominal (STC) 60.51 MWp

Array #1 - LOTTO A-T1

Number of PV modules 2772 units
Nominal (STC) 1913 kWp
Modules 99 string x 28 In series

At operating cond. (50°C)

Pmpp 1769 kWp
U mpp 1022 V
I mpp 1731 A

Inverter

Manufacturer Huawei Technologies
Model SUN2000-215KTL-H0
(Custom parameters definition)
Unit Nom. Power 200 kWac
Number of inverters 285 units
Total power 57000 kWac

Number of inverters 9 units
Total power 1800 kWac

Operating voltage 550-1500 V
Max. power (=>30°C) 215 kWac
Pnom ratio (DC:AC) 1.06
Power sharing within this inverter



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PV Array Characteristics

Array #2 - LOTTO A-T2

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #3 - LOTTO A-T3

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #4 - LOTTO A-T4

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #5 - LOTTO A-T5

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #6 - LOTTO A-T6

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #7 - LOTTO A-T7

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	



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PV Array Characteristics

Array #8 - LOTTO A-T8

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #9 - LOTTO A-T9

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #10 - LOTTO A-T10

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #11 - LOTTO A-T11

Number of PV modules	1960 units	Number of inverters	6 units
Nominal (STC)	1352 kWp	Total power	1200 kWac
Modules	70 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1251 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.13
I mpp	1224 A	Power sharing within this inverter	

Array #12 - LOTTO B-T1

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #13 - LOTTO B-T2

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	



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PV Array Characteristics

Array #14 - LOTTO B-T3

Number of PV modules	2800 units	Number of inverters	9 units
Nominal (STC)	1932 kWp	Total power	1800 kWac
Modules	100 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1787 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1749 A	Pnom ratio (DC:AC)	1.07
		Power sharing within this inverter	

Array #15 - LOTTO B-T4

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1769 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1731 A	Pnom ratio (DC:AC)	1.06
		Power sharing within this inverter	

Array #16 - LOTTO B-T5

Number of PV modules	2828 units	Number of inverters	9 units
Nominal (STC)	1951 kWp	Total power	1800 kWac
Modules	101 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1805 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1766 A	Pnom ratio (DC:AC)	1.08
		Power sharing within this inverter	

Array #17 - LOTTO B-T6

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1769 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1731 A	Pnom ratio (DC:AC)	1.06
		Power sharing within this inverter	

Array #18 - LOTTO B-T7

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1769 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1731 A	Pnom ratio (DC:AC)	1.06
		Power sharing within this inverter	

Array #19 - LOTTO B-T8

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)			
Pmpp	1769 kWp	Operating voltage	550-1500 V
U mpp	1022 V	Max. power (=>30°C)	215 kWac
I mpp	1731 A	Pnom ratio (DC:AC)	1.06
		Power sharing within this inverter	



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PV Array Characteristics

Array #20 - LOTTO B-T9

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #21 - LOTTO B-T10

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #22 - LOTTO B-T11

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #23 - LOTTO B-T12

Number of PV modules	2044 units	Number of inverters	7 units
Nominal (STC)	1410 kWp	Total power	1400 kWac
Modules	73 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1305 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.01
I mpp	1277 A	Power sharing within this inverter	

Array #24 - LOTTO C-T1

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #25 - LOTTO C-T2

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	



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PV Array Characteristics

Array #26 - LOTTO C-T3

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #27 - LOTTO C-T4

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #28 - LOTTO C-T5

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #29 - LOTTO C-T6

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #30 - LOTTO C-T7

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	

Array #31 - LOTTO C-T8

Number of PV modules	2772 units	Number of inverters	9 units
Nominal (STC)	1913 kWp	Total power	1800 kWac
Modules	99 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1769 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.06
I mpp	1731 A	Power sharing within this inverter	



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PV Array Characteristics

Array #32 - LOTTO C-T9

Number of PV modules	2268 units	Number of inverters	8 units
Nominal (STC)	1565 kWp	Total power	1600 kWac
Modules	81 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	1448 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	0.98
I mpp	1416 A	Power sharing within this inverter	

Array #33 - LOTTO C-UNITUS

Number of PV modules	952 units	Number of inverters	3 units
Nominal (STC)	657 kWp	Total power	600 kWac
Modules	34 string x 28 In series		
At operating cond. (50°C)		Operating voltage	550-1500 V
Pmpp	608 kWp	Max. power (=>30°C)	215 kWac
U mpp	1022 V	Pnom ratio (DC:AC)	1.09
I mpp	595 A	Power sharing within this inverter	

Total PV power

Nominal (STC)	60510 kWp
Total	87696 modules
Module area	272415 m²

Total inverter power

Total power	57000 kWac
Max. power	61275 kWac
Number of inverters	285 units
Pnom ratio	1.06

Array losses

Thermal Loss factor

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

Serie Diode Loss

Voltage drop	0.7 V
Loss Fraction	0.1 % at STC

Module Quality Loss

Loss Fraction	-2.5 %
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Module mismatch losses

Loss Fraction	2.0 % at MPP
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Strings Mismatch loss

Loss Fraction	0.2 %
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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	0.403	0.000

DC wiring losses

Global wiring resistance	0.30 mΩ
Loss Fraction	1.5 % at STC

Array #1 - LOTTO A-T1

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #3 - LOTTO A-T3

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #5 - LOTTO A-T5

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #7 - LOTTO A-T7

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #2 - LOTTO A-T2

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #4 - LOTTO A-T4

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #6 - LOTTO A-T6

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC

Array #8 - LOTTO A-T8

Global array res.	9.6 mΩ
Loss Fraction	1.5 % at STC



DC wiring losses

Array #9 - LOTTO A-T9

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #11 - LOTTO A-T11

Global array res. 14 mΩ
Loss Fraction 1.5 % at STC

Array #13 - LOTTO B-T2

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #15 - LOTTO B-T4

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #17 - LOTTO B-T6

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #19 - LOTTO B-T8

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #21 - LOTTO B-T10

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #23 - LOTTO B-T12

Global array res. 13 mΩ
Loss Fraction 1.5 % at STC

Array #25 - LOTTO C-T2

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #27 - LOTTO C-T4

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #29 - LOTTO C-T6

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #31 - LOTTO C-T8

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #33 - LOTTO C-UNITUS

Global array res. 28 mΩ
Loss Fraction 1.5 % at STC

Array #10 - LOTTO A-T10

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #12 - LOTTO B-T1

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #14 - LOTTO B-T3

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #16 - LOTTO B-T5

Global array res. 9.5 mΩ
Loss Fraction 1.5 % at STC

Array #18 - LOTTO B-T7

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #20 - LOTTO B-T9

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #22 - LOTTO B-T11

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #24 - LOTTO C-T1

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #26 - LOTTO C-T3

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #28 - LOTTO C-T5

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

Array #30 - LOTTO C-T7

Global array res. 9.6 mΩ
Loss Fraction 1.5 % at STC

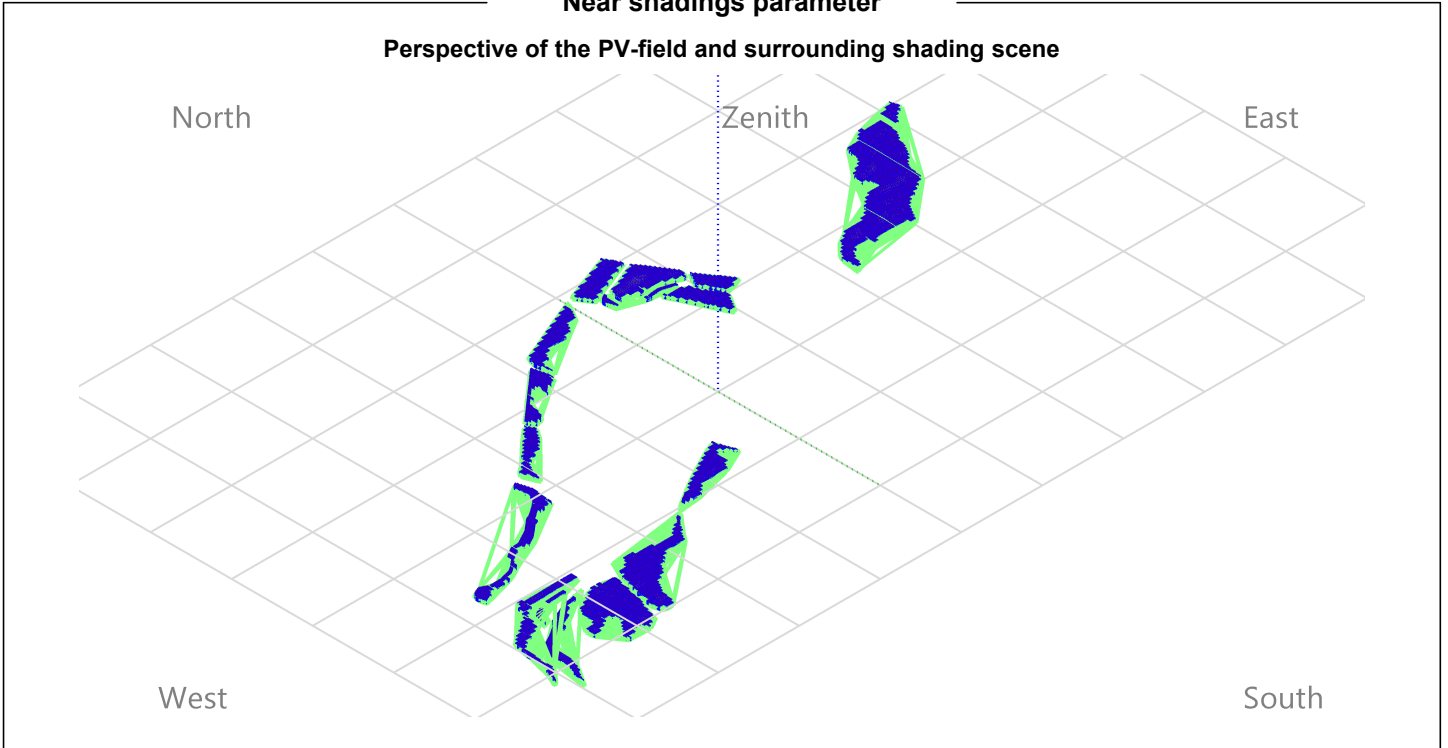
Array #32 - LOTTO C-T9

Global array res. 12 mΩ
Loss Fraction 1.5 % at STC



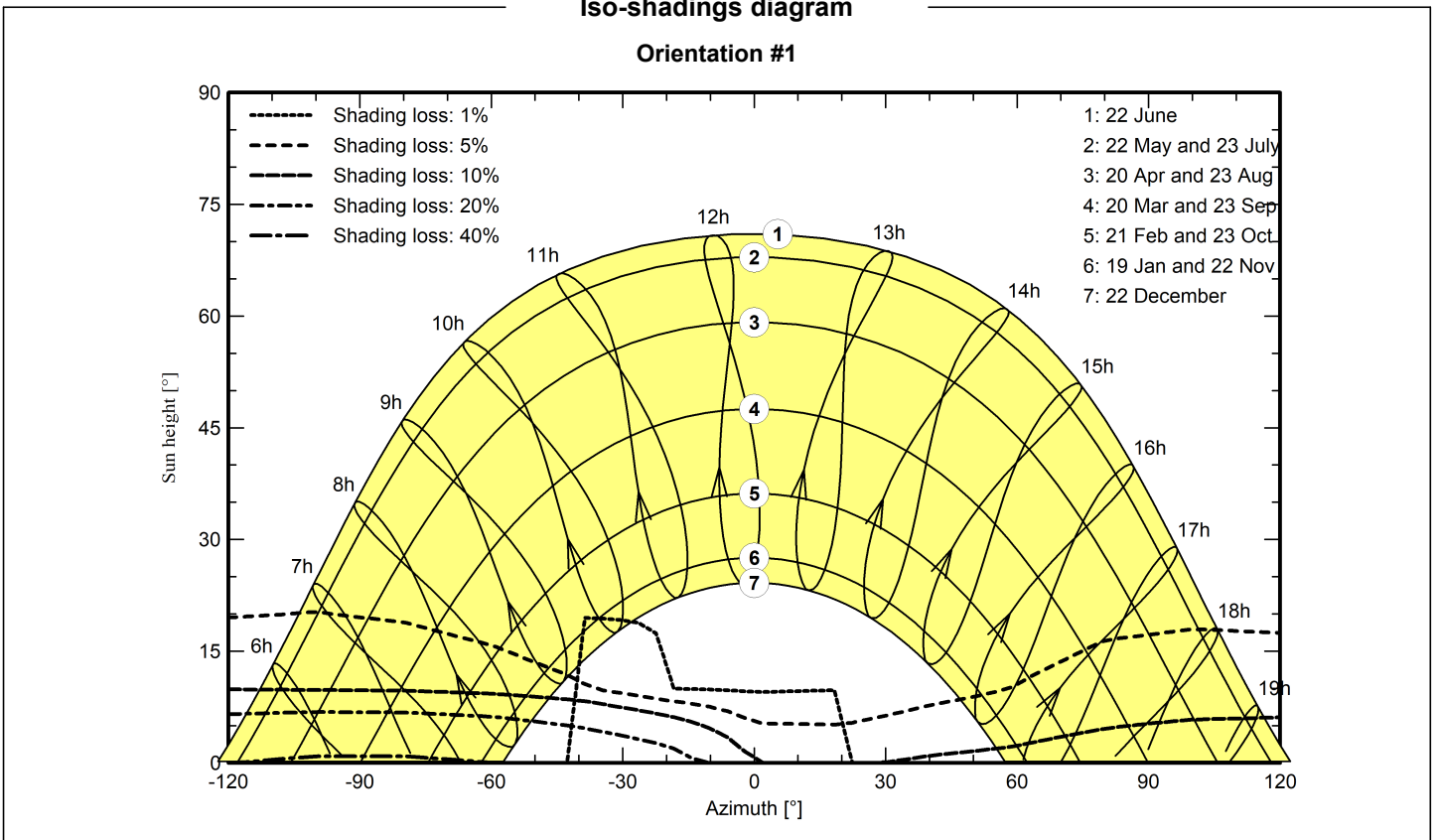
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1



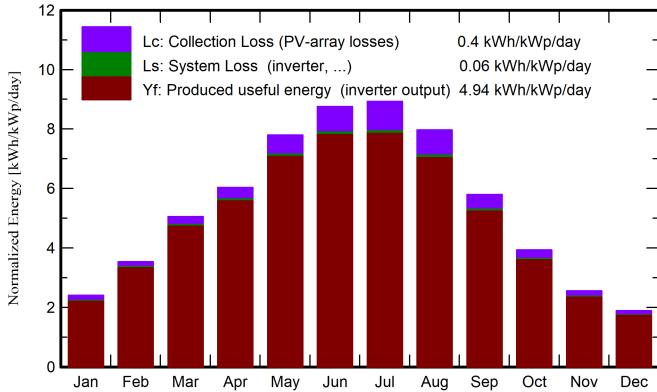


Main results

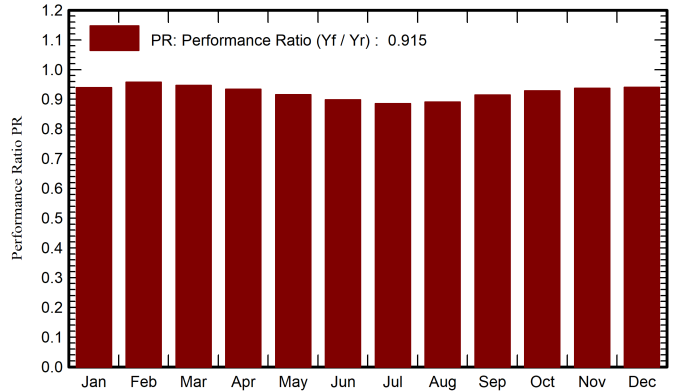
System Production

Produced Energy (P50) 109133423 kWh/year Specific production (P50) 1804 kWh/kWp/year Perf. Ratio PR 91.53 %
 Produced Energy (P90) 103814630 kWh/year Specific production (P90) 1716 kWh/kWp/year
 Produced Energy (P95) 102318128 kWh/year Specific production (P95) 1691 kWh/kWp/year

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

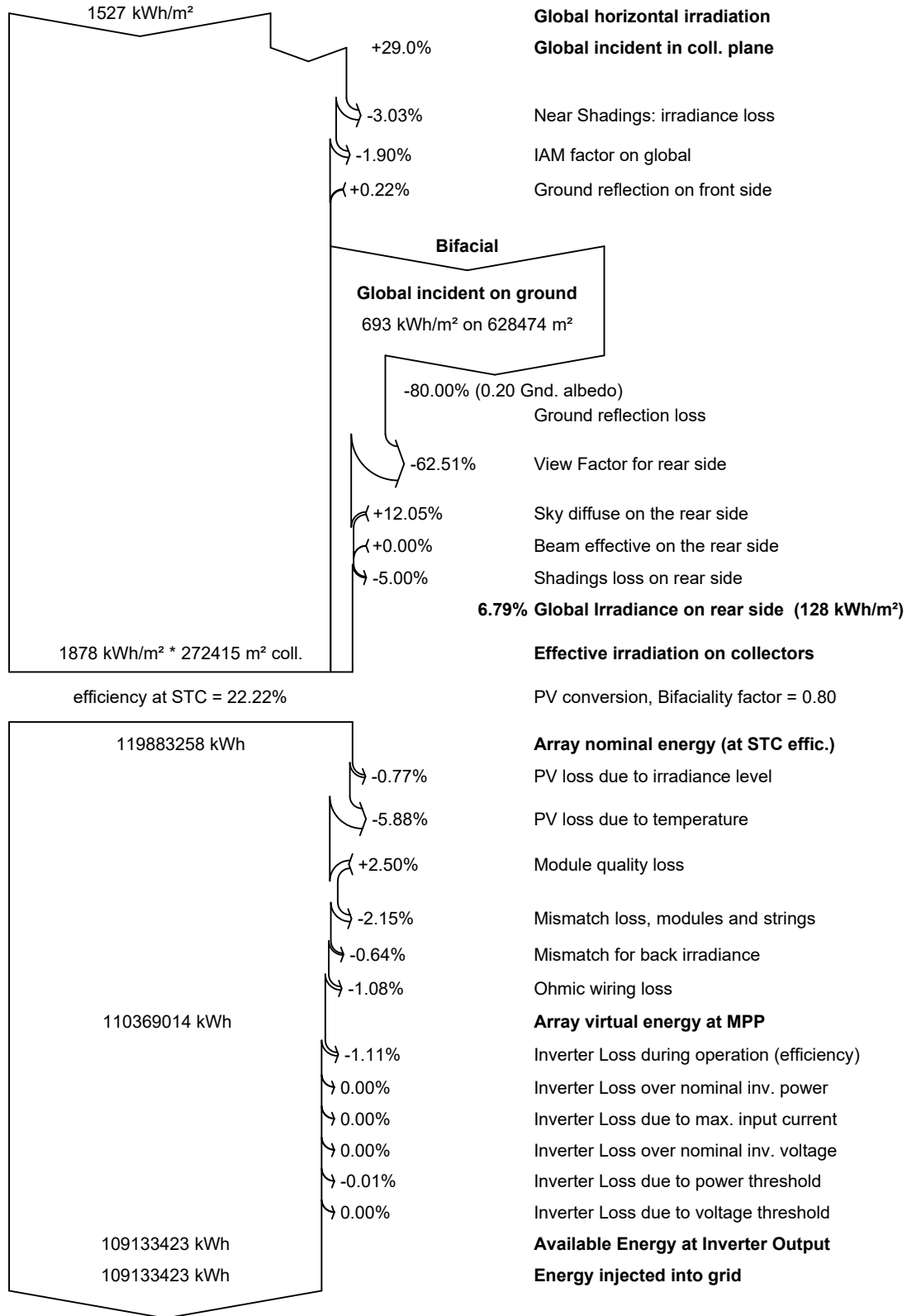
	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	E_Grid kWh	PR ratio
January	54.1	21.74	6.95	74.4	69.1	4289978	4233623	0.940
February	75.4	32.56	7.88	99.0	93.8	5804682	5735082	0.957
March	121.0	51.25	11.09	156.7	149.2	9077250	8976316	0.947
April	143.8	62.69	14.38	181.2	173.5	10350566	10235788	0.934
May	192.2	78.36	18.74	241.6	231.5	13524973	13379911	0.915
June	206.1	76.82	23.25	262.6	251.8	14431558	14276978	0.898
July	215.1	78.97	26.40	277.0	265.5	15001173	14841473	0.886
August	189.1	68.84	26.13	247.0	237.0	13451699	13307355	0.890
September	134.4	60.80	21.23	173.8	165.7	9717998	9611348	0.914
October	93.4	43.36	17.34	121.9	115.5	6934238	6854143	0.929
November	57.8	26.40	12.06	76.6	71.7	4405126	4347166	0.938
December	44.8	23.53	8.26	58.6	54.0	3379412	3334240	0.940
Year	1527.3	625.31	16.19	1970.5	1878.5	110368653	109133423	0.915

Legends

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



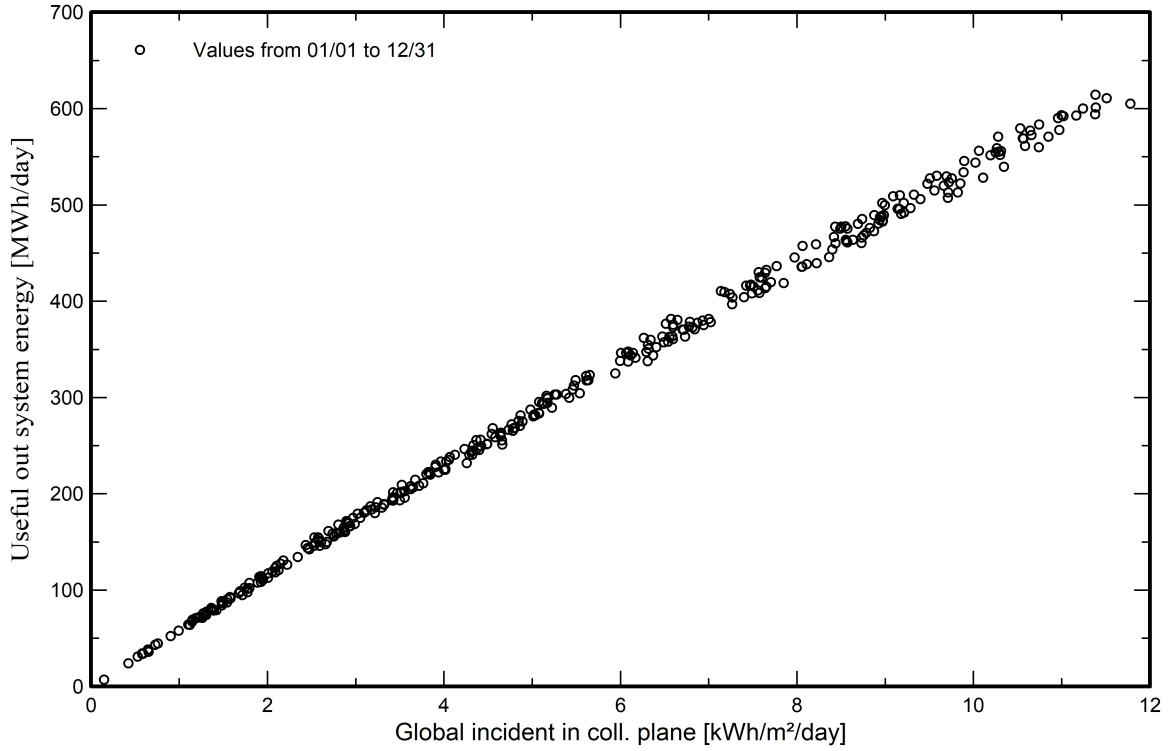
Loss diagram



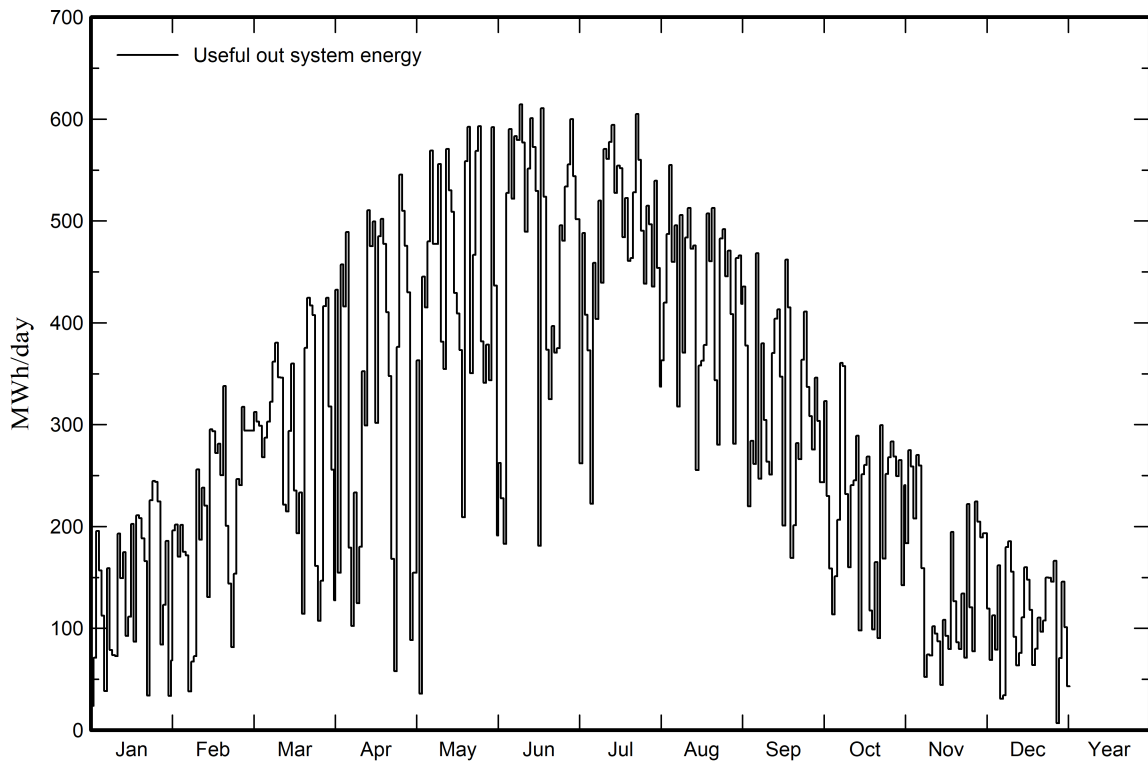


Predef. graphs

Daily Input/Output diagram



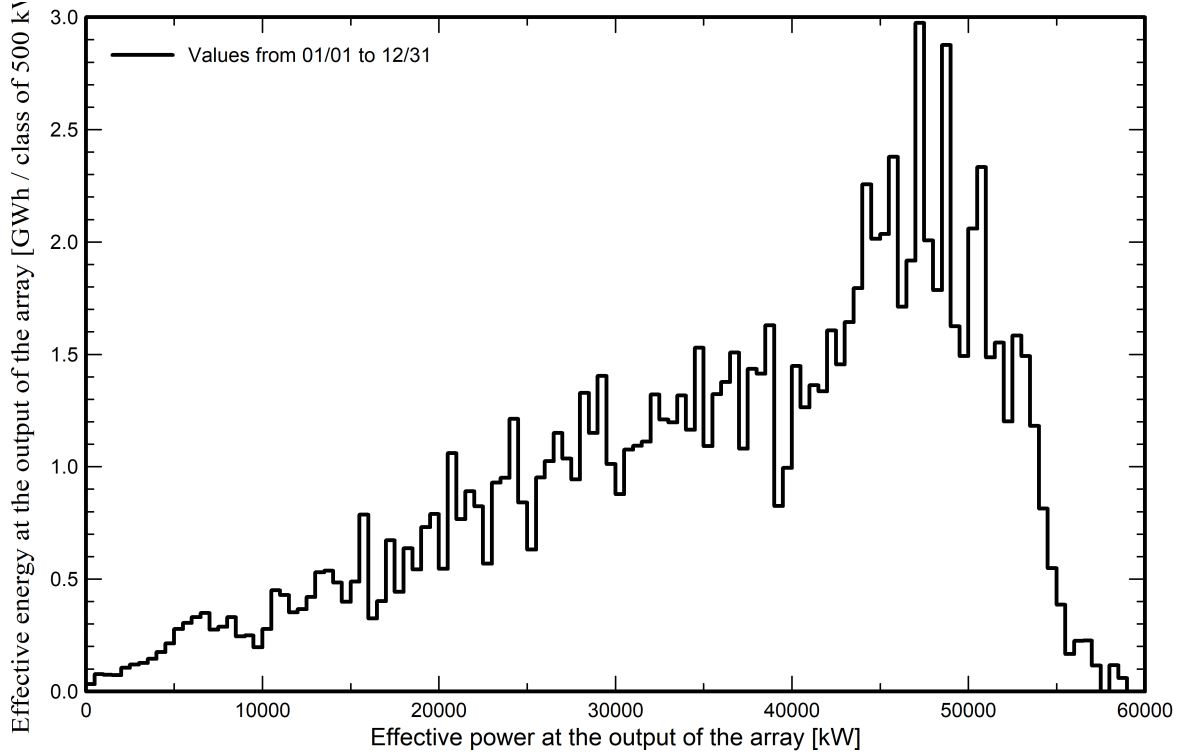
Daily System Output Energy



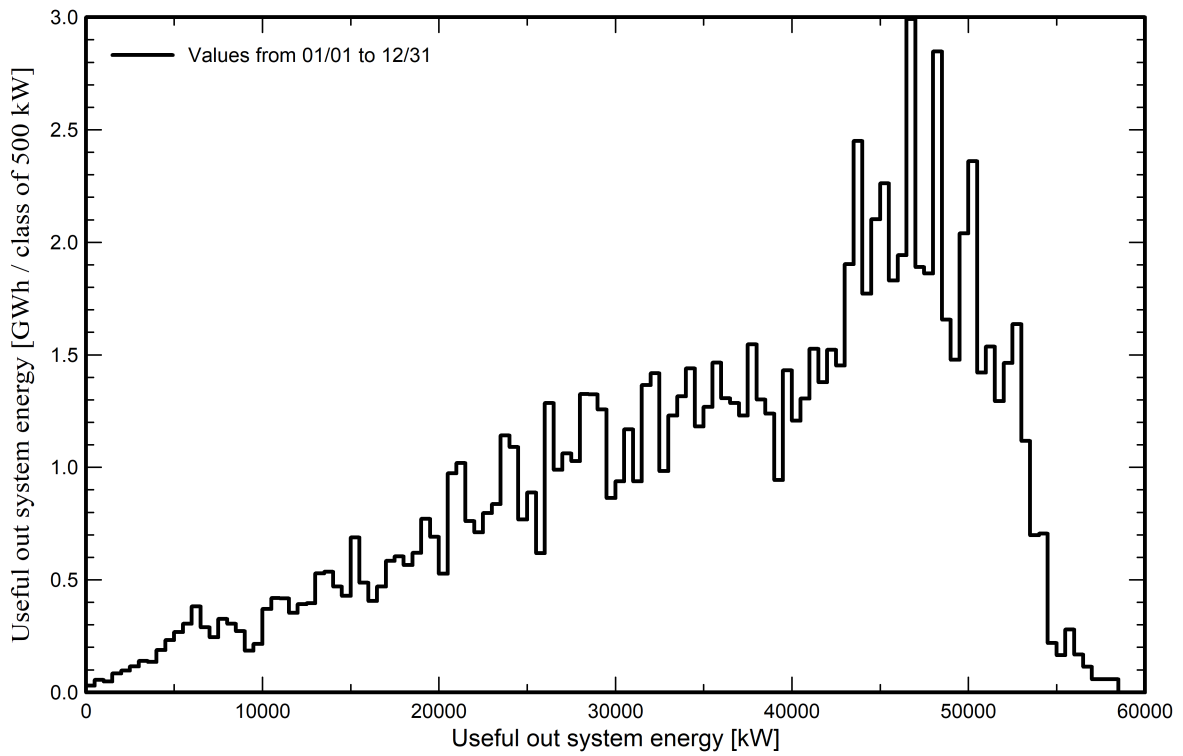


Predef. graphs

Array Power Distribution

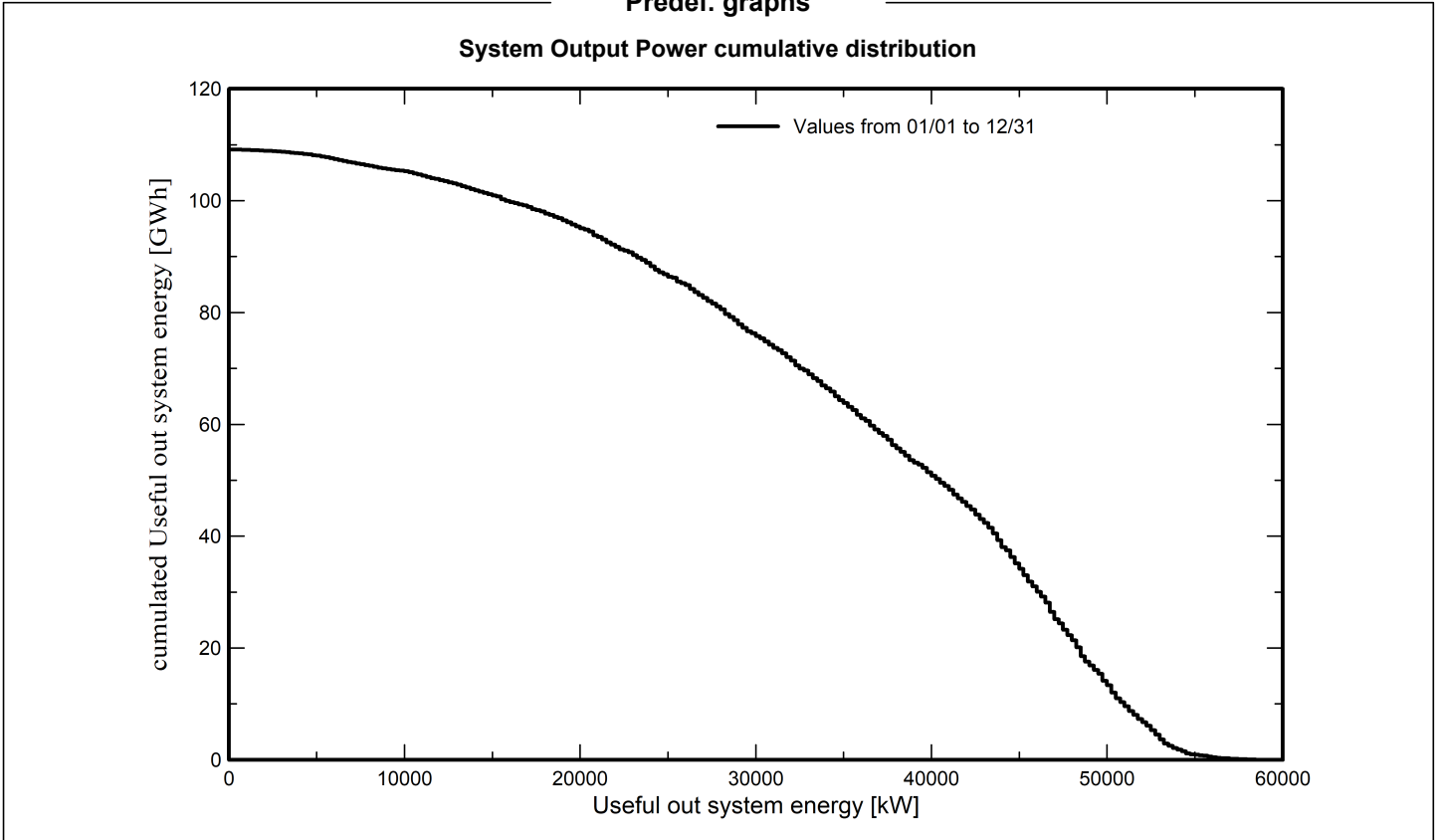


System Output Power Distribution





Predef. graphs





PVsyst V7.4.5

VC2, Simulation date:
02/14/24 17:56
with v7.4.5

Studio Santi srl (Italy)

P50 - P90 evaluation

Meteo data

Source Meteonorm 8.1 (1991-2014), Sat=21%
Kind Monthly averages
Synthetic - Multi-year average
Year-to-year variability(Variance) 3.3 %

Specified Deviation

Climate change 0.0 %

Global variability (meteo + system)

Variability (Quadratic sum) 3.8 %

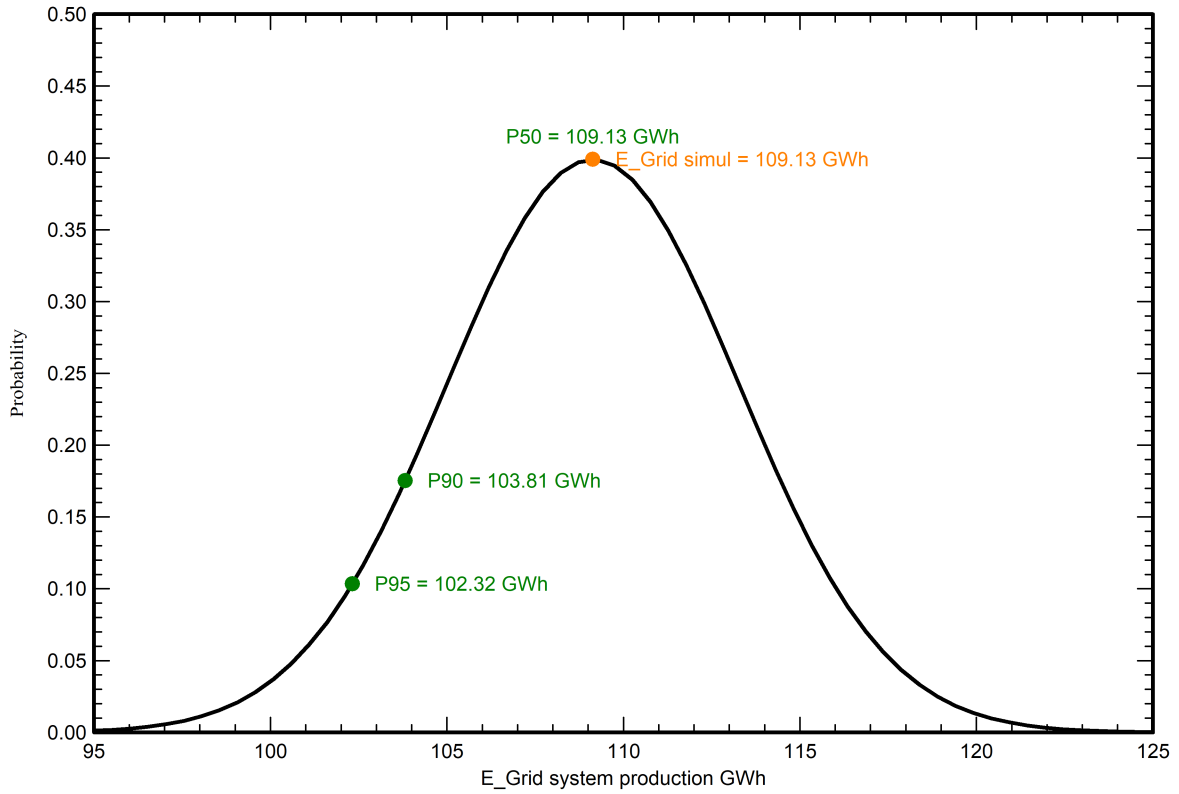
Simulation and parameters uncertainties

PV module modelling/parameters 1.0 %
Inverter efficiency uncertainty 0.5 %
Soiling and mismatch uncertainties 1.0 %
Degradation uncertainty 1.0 %

Annual production probability

Variability 4.15 GWh
P50 109.13 GWh
P90 103.81 GWh
P95 102.32 GWh

Probability distribution





PVsyst V7.4.5

VC2, Simulation date:
02/14/24 17:56
with v7.4.5

Single-line diagram



PV module Canadian- TOPBiHiKu7- CS7N-690TB-AG

Inverter SUN2000-215KTL-H0

String 28 x Canadian- TOPBiHiKu7- CS7N-690TB-AG

RP GLOBAL PV

Studio Santi srl (It
aly)

VC2 : -38 to +38

02/14/24