

PVsyst - Simulation report

Grid-Connected System

Project: 300MW PV POWER PLANT

Variant: New simulation variant

Unlimited sheds

System power: 300.0 MWp

Seyyedābād - Iran



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PVsyst V7.3.1

VCO, Simulation date:
04/14/24 16:03
with v7.3.1

Project summary

Geographical Site Seyyedābād Iran		Situation Latitude 32.15 °N Longitude 51.86 °E Altitude 1709 m Time zone UTC+3.5		Project settings Albedo 0.20	
Meteo data Seyyedābād Meteonorm 8.1 (1985-2002), Sat=100% - Synthetic					

System summary

Grid-Connected System		Unlimited sheds		User's needs	
PV Field Orientation Sheds Tilt 20 ° Azimuth 0 °		Near Shadings Mutual shadings of sheds		Unlimited load (grid)	
System information					
PV Array					
Nb. of modules	441168 units	Inverters		Nb. of units	2454 units
Pnom total	300.0 MWp			Pnom total	269.9 MWac
				Pnom ratio	1.111

Results summary

Produced Energy	654309763 kWh/year	Specific production	2181 kWh/kWp/year	Perf. Ratio PR	84.60 %
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General parameters

Grid-Connected System		Unlimited sheds			
PV Field Orientation		Sheds configuration		Models used	
Orientation		Nb. of sheds		Transposition	
Sheds		5 units		Perez	
Tilt	20 °	Unlimited sheds		Diffuse	
Azimuth	0 °	Sizes		Perez, Meteonorm	
		Sheds spacing		Circumsolar	
		Collector width		separate	
		Ground Cov. Ratio (GCR)			
		Top inactive band			
		Bottom inactive band			
		Shading limit angle			
		Limit profile angle		8.8 °	
Horizon		Near Shadings		User's needs	
Average Height	3.1 °	Mutual shadings of sheds		Unlimited load (grid)	
Bifacial system					
Model	2D Calculation				
	unlimited sheds				
Bifacial model geometry				Bifacial model definitions	
Sheds spacing	9.50 m	Ground albedo		0.30	
Sheds width	3.04 m	Bifaciality factor		72 %	
Limit profile angle	8.9 °	Rear shading factor		5.0 %	
GCR	32.0 %	Rear mismatch loss		10.0 %	
Height above ground	1.50 m	Shed transparent fraction		0.0 %	

PV Array Characteristics

PV module		Inverter	
Manufacturer	Trina Solar	Manufacturer	Auxsol
Model	TSM-DEG21C-20-680Wp Vertex	Model	Auxsol
(Custom parameters definition)		(Original PVsyst database)	
Unit Nom. Power	680 Wp	Unit Nom. Power	110 kWac
Number of PV modules	441168 units	Number of inverters	2454 units
Nominal (STC)	300.0 MWp	Total power	269940 kWac
Modules	27573 Strings x 16 In series	Operating voltage	200-850 V
At operating cond. (50°C)		Pnom ratio (DC:AC)	1.11
Pmpp	274.3 MWp	Power sharing within this inverter	
U mpp	574 V		
I mpp	477761 A		
Total PV power		Total inverter power	
Nominal (STC)	299994 kWp	Total power	269940 kWac
Total	441168 modules	Number of inverters	2454 units
Module area	1370423 m²	Pnom ratio	1.11



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Array losses

Array Soiling Losses

Loss Fraction 3.0 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const) 29.0 W/m²K

Uv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 0.020 mΩ

Loss Fraction 1.5 % at STC

Module Quality Loss

Loss Fraction -0.4 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

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

System losses

Unavailability of the system

Time fraction 2.0 %
7.3 days,
3 periods

Auxiliaries loss

constant (fans) 300 kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to injection point

Inverter voltage 400 Vac tri

Loss Fraction 0.59 % at STC

Inverter: Auxsol

Wire section (2454 Inv.) Copper 2454 x 3 x 240 mm²

Average wires length 100 m



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Horizon definition

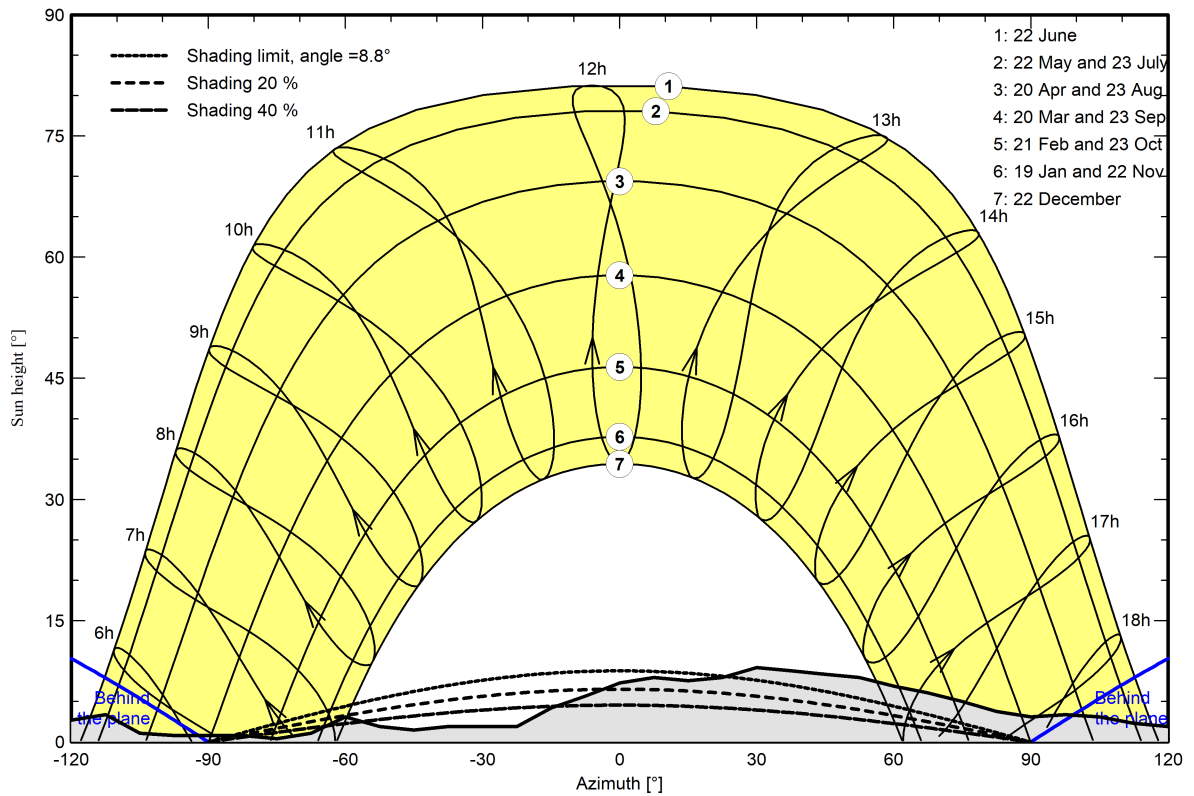
Horizon from PVGIS website API, Lat=32°9'3", Long=51°51'20", Alt=1709m

Average Height	3.1 °	Albedo Factor	0.72
Diffuse Factor	0.97	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-165	-158	-135	-128	-120	-113	-105	-98	-83	-75
Height [°]	1.5	1.5	0.8	0.8	0.4	2.7	3.4	1.1	0.8	0.8	0.4
Azimuth [°]	-68	-60	-53	-45	-38	-23	-15	-8	0	8	15
Height [°]	1.1	3.1	1.9	1.5	1.9	1.9	4.2	5.7	7.3	8.0	7.6
Azimuth [°]	23	30	38	45	53	60	68	75	83	90	98
Height [°]	8.0	9.2	8.8	8.4	8.0	6.9	6.1	5.0	3.8	3.1	3.4
Azimuth [°]	105	113	120	128	135	143	150	165	173	180	
Height [°]	3.1	2.3	1.9	1.5	0.8	1.1	0.8	0.8	1.5	1.5	

Sun Paths (Height / Azimuth diagram)





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Main results

System Production

Produced Energy 654309763 kWh/year

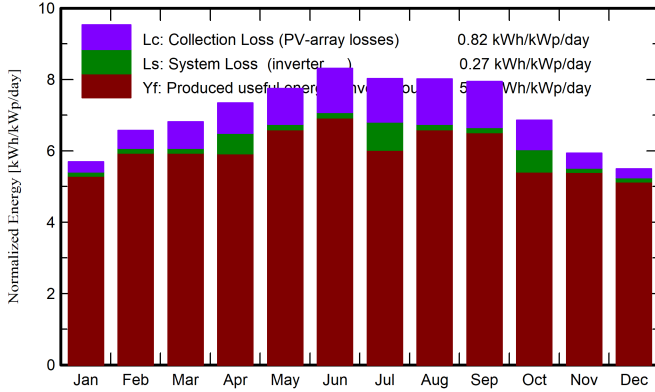
Specific production

2181 kWh/kWp/year

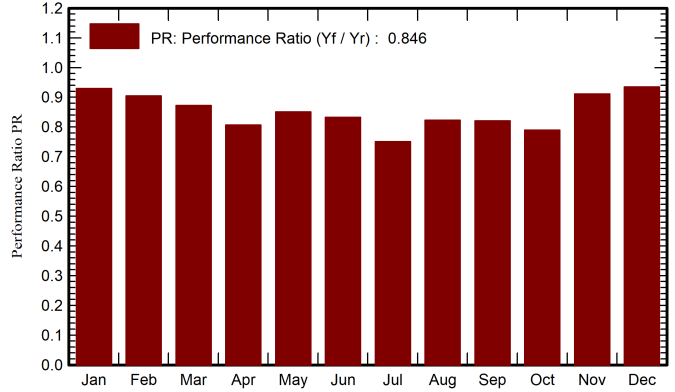
Performance Ratio PR

84.60 %

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	123.3	24.57	1.59	176.5	165.9	50319763	49227485	0.930
February	140.4	23.31	4.92	184.0	174.7	51039590	49946822	0.905
March	181.1	44.27	10.39	211.2	200.0	56496926	55243325	0.872
April	207.8	52.46	15.38	220.3	208.1	58482008	53329710	0.807
May	242.9	56.46	21.34	240.1	226.8	62757909	61320670	0.851
June	262.1	42.39	26.66	249.4	235.9	63776143	62335898	0.833
July	257.2	48.91	29.61	248.9	235.3	63385180	56059035	0.751
August	241.4	41.28	27.55	248.6	235.1	62755002	61376558	0.823
September	211.4	29.72	22.87	238.2	225.4	59955143	58652795	0.821
October	169.4	30.09	16.64	212.5	201.6	56181923	50353529	0.790
November	127.7	25.52	7.86	178.0	167.9	49733080	48669068	0.912
December	114.9	19.51	3.24	170.3	160.9	48874780	47794867	0.935
Year	2279.6	438.51	15.73	2578.0	2437.6	683757448	654309763	0.846

Legends

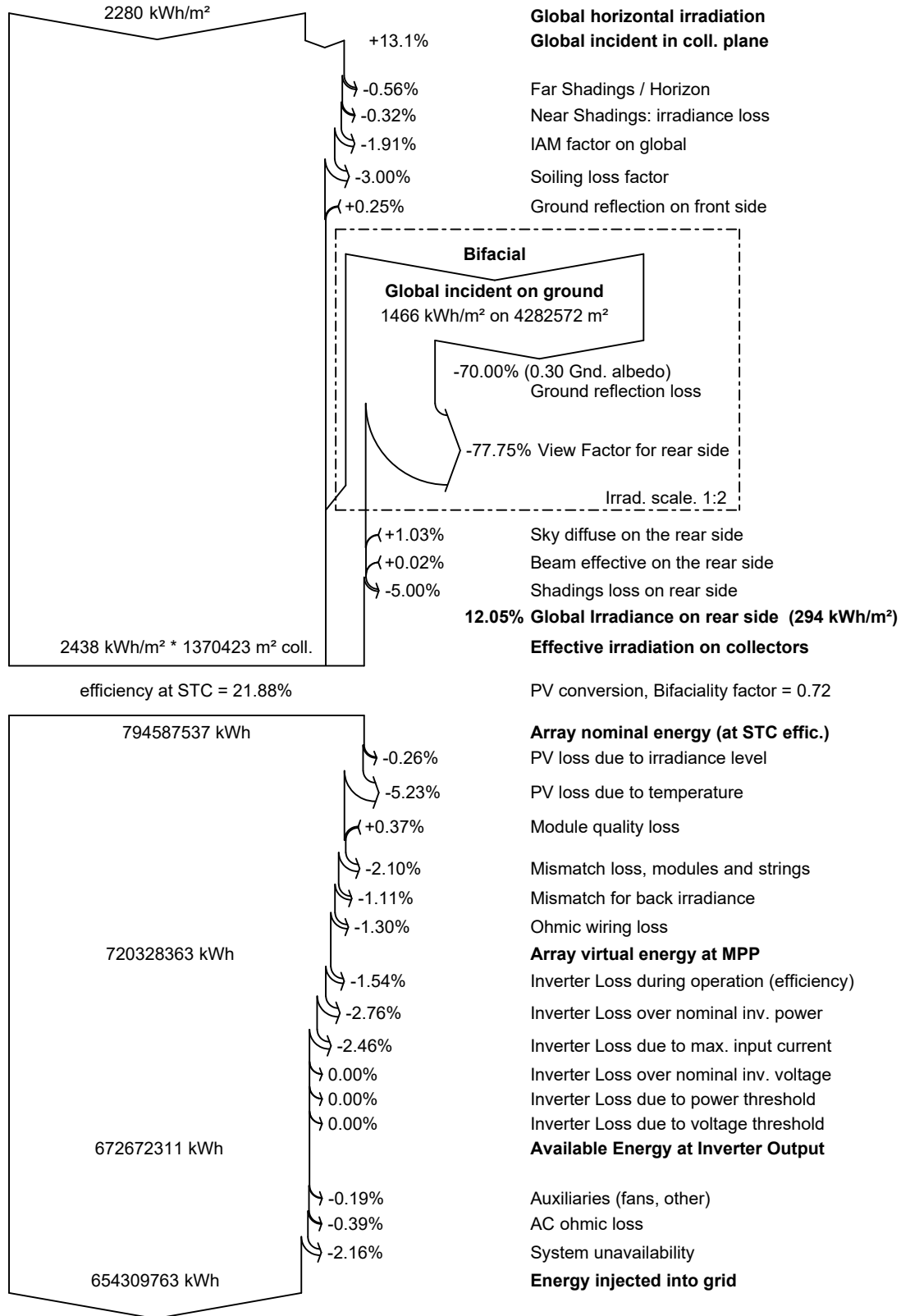
GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		



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Loss diagram



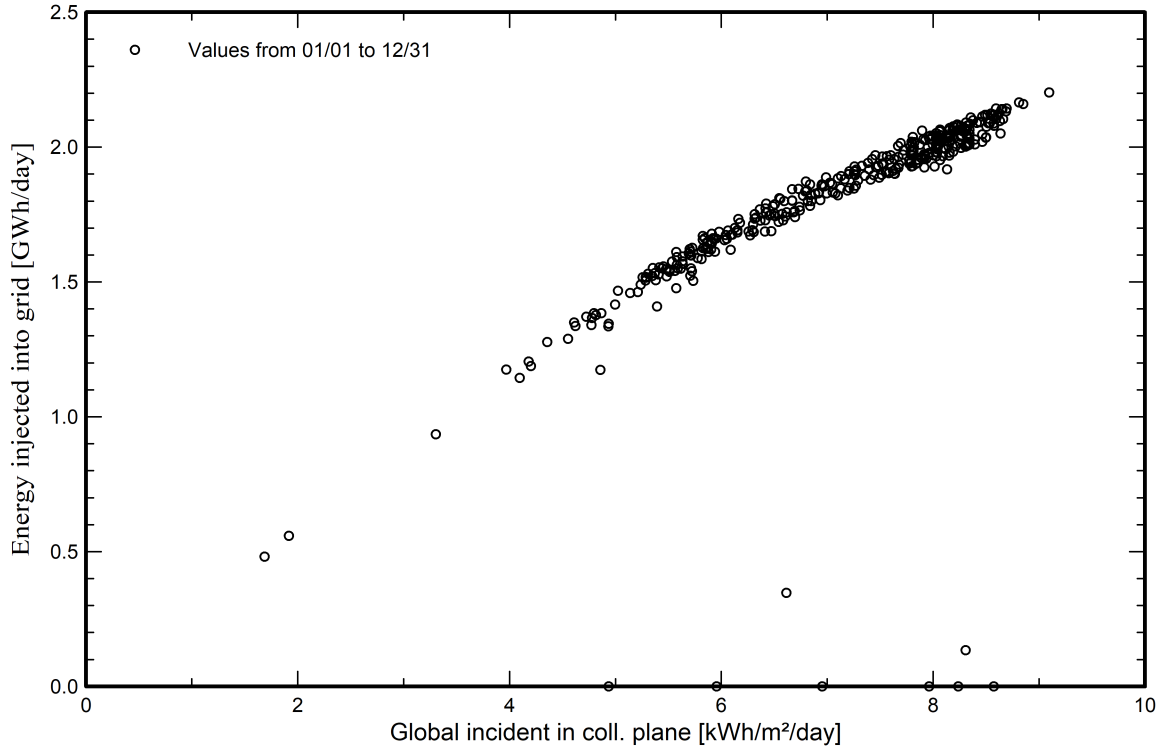


PVsyst V7.3.1

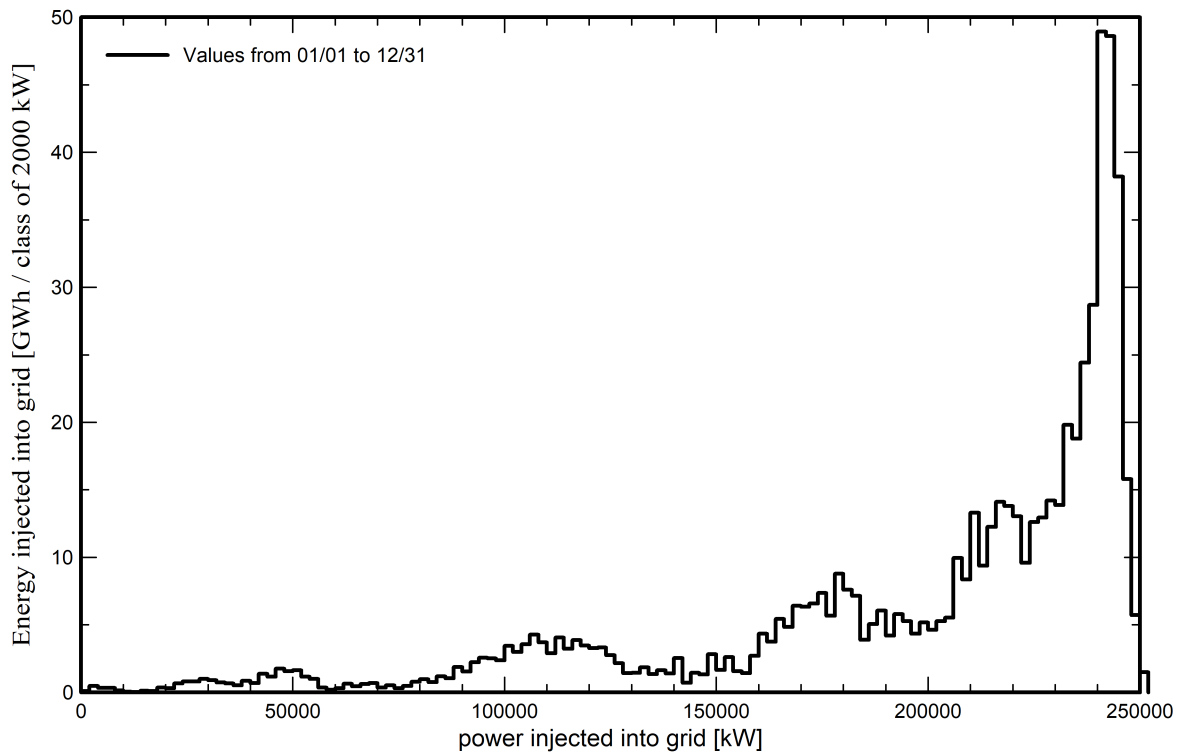
VC0, Simulation date:
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Predef. graphs

Daily Input/Output diagram



System Output Power Distribution

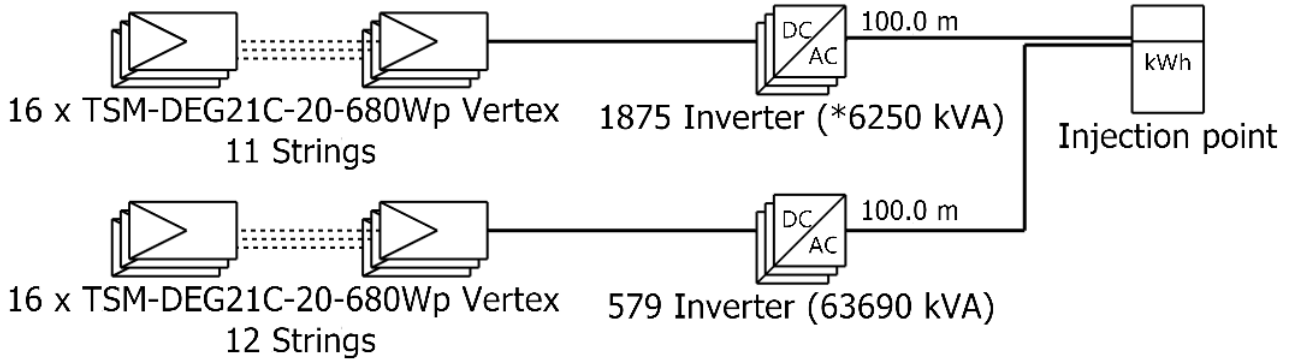




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Single-line diagram



PV module	TSM-DEG21C-20-680Wp Vertex
Inverter	Auxsol
String	16 x TSM-DEG21C-20-680Wp Vertex

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