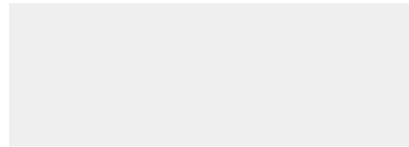


VEESLA UAB

Galinės g. 8, Galinė, Avižienių sen., Vilniaus r.
14247
Lietuva



2023-07-05

Your PV system from VEESLA UAB

Address of Installation

Kaimiško gatvė, Miežiškiai, Panevėžys



Project Overview



Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System

Climate Data	Panevežys, LTU (1996 - 2015)
Values source	Meteonorm 8.1(i)
PV Generator Output	180,11 kWp
PV Generator Surface	847,5 m ²
Number of PV Modules	434
Number of Inverters	2

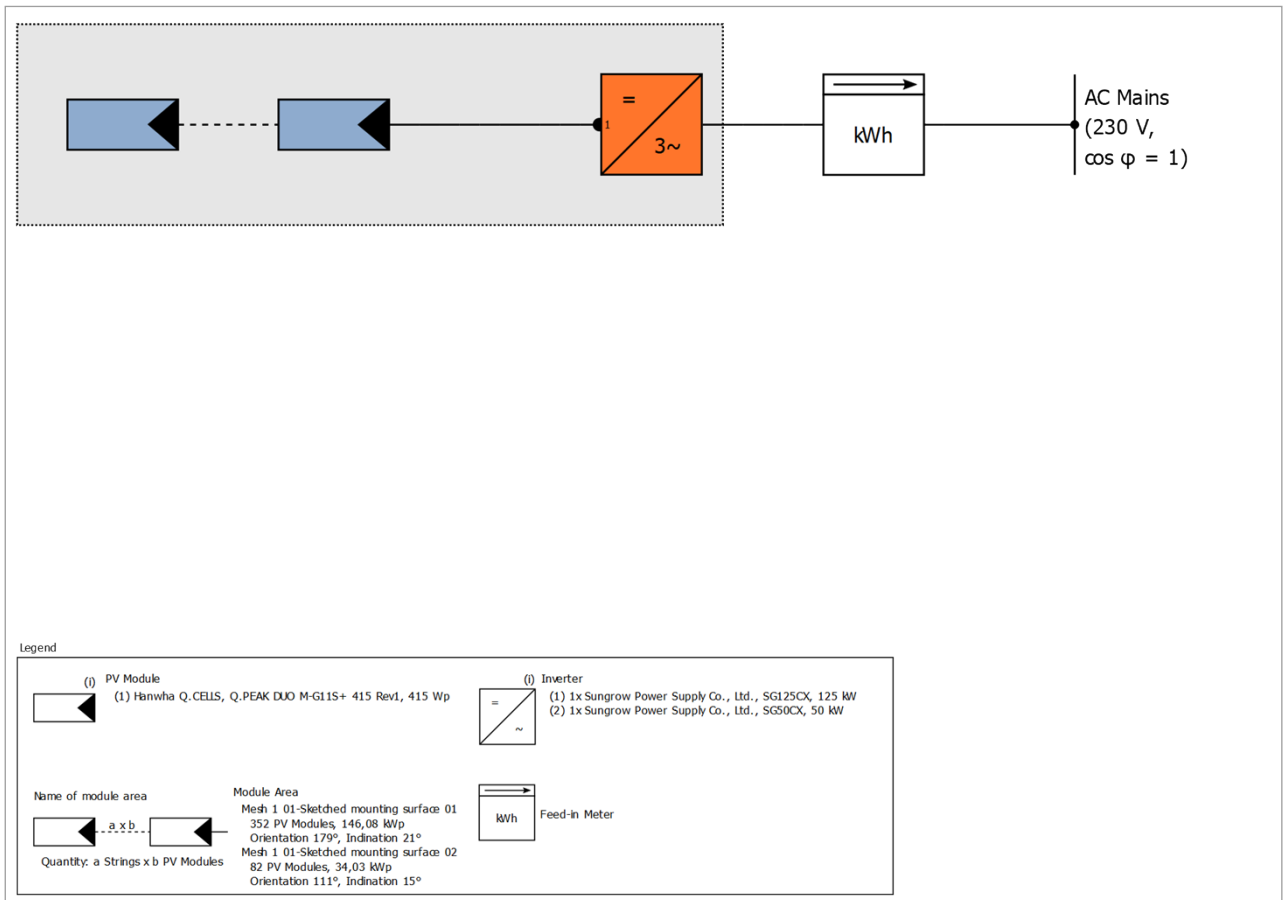


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	180,11 kWp
Spec. Annual Yield	1 033,85 kWh/kWp
Performance Ratio (PR)	91,18 %
Yield Reduction due to Shading	1,8 %
Grid Export	186 241 kWh/Year
Grid Export in the first year (incl. module degradation)	186 241 kWh/Year
Standby Consumption (Inverter)	34 kWh/Year
CO ₂ Emissions avoided	87 517 kg / year

The results have been calculated with a mathematical model calculation from Valentin Software GmbH (PV*SOL algorithms). The actual yields from the solar power system may differ as a result of weather variations, the efficiency of the modules and inverter, and other factors.

Set-up of the System

Overview

System Data

Type of System	3D, Grid-connected PV System
----------------	------------------------------

Climate Data

Location	Panevežys, LTU (1996 - 2015)
Values source	Meteonorm 8.1(i)
Resolution of the data	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

Module Areas

1. Module Area - Mesh 1 01-Sketched mounting surface 01

PV Generator, 1. Module Area - Mesh 1 01-Sketched mounting surface 01

Name	Mesh 1 01-Sketched mounting surface 01
PV Modules	352 x Q.PEAK DUO M-G11S+ 415 Rev1 (v1)
Manufacturer	Hanwha Q.CELLS
Inclination	21 °
Orientation	South 179 °
Installation Type	Mounted - Roof
PV Generator Surface	687,4 m ²



Figure: 1. Module Area - Mesh 1 01-Sketched mounting surface 01

2. Module Area - Mesh 1 01-Sketched mounting surface 02

PV Generator, 2. Module Area - Mesh 1 01-Sketched mounting surface 02

Name	Mesh 1 01-Sketched mounting surface 02
PV Modules	82 x Q.PEAK DUO M-G11S+ 415 Rev1 (v1)
Manufacturer	Hanwha Q.CELLS
Inclination	15 °
Orientation	East 111 °
Installation Type	Mounted - Roof
PV Generator Surface	160,1 m ²

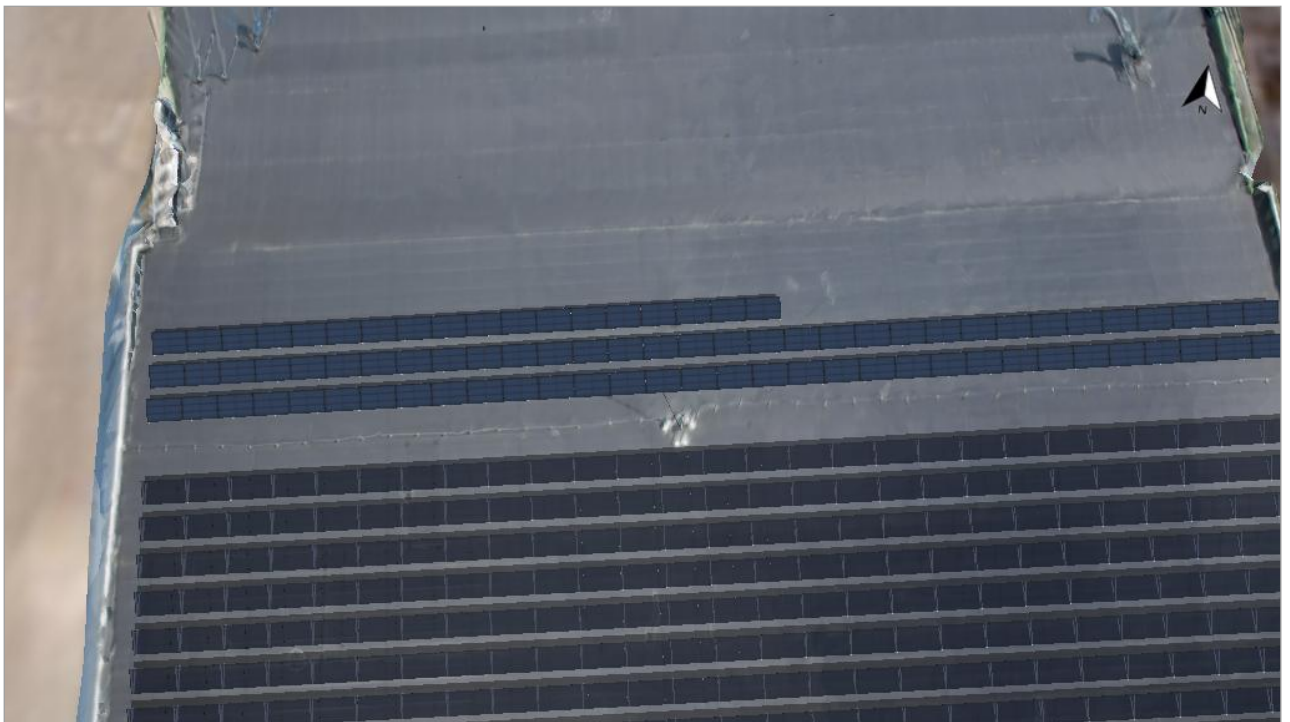


Figure: 2. Module Area - Mesh 1 01-Sketched mounting surface 02

Horizon Line, 3D Design

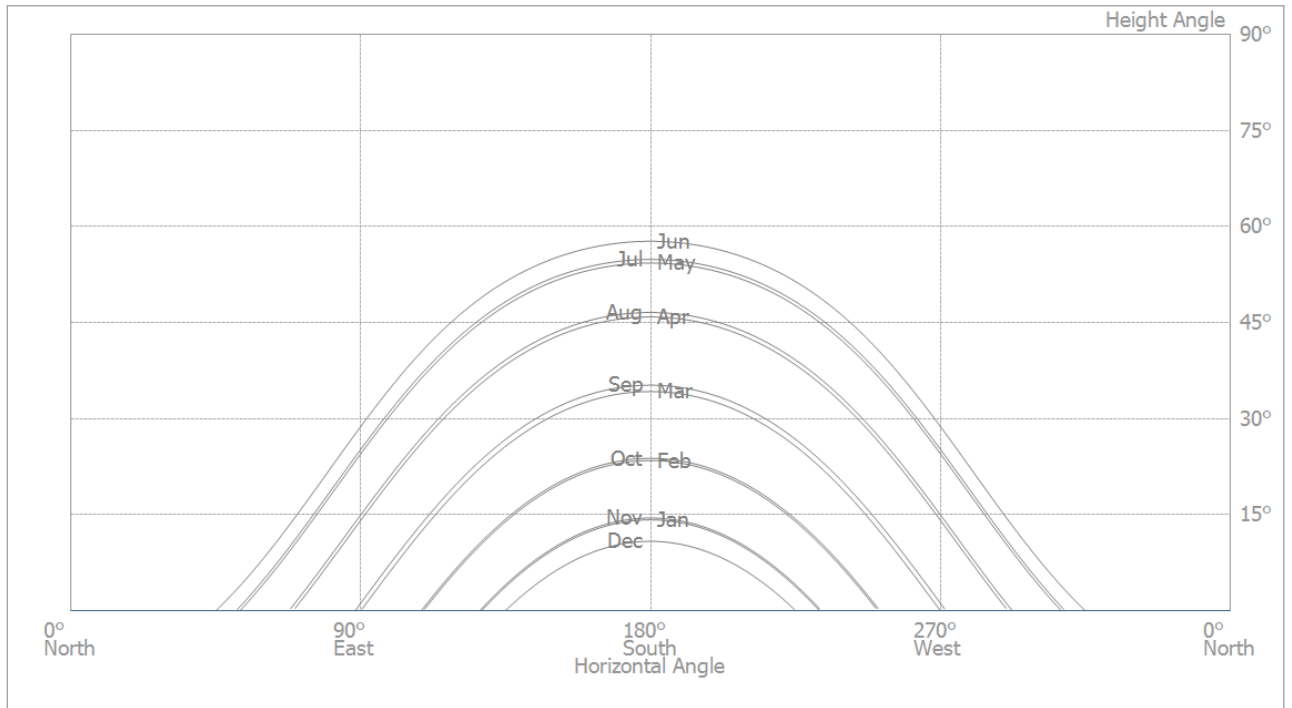


Figure: Horizon (3D Design)

Inverter configuration

Configuration 1

Module Areas	Mesh 1 01-Sketched mounting surface 01 + Mesh 1 01-Sketched mounting surface 02
Inverter 1	
Model	SG125CX (v2)
Manufacturer	Sungrow Power Supply Co., Ltd.
Quantity	1
Sizing Factor	104,9 %
Configuration	MPP 1: 2 x 16
	MPP 2: 2 x 16
	MPP 3: 2 x 16
	MPP 4: 2 x 17
	MPP 5: 2 x 17
	MPP 6: 2 x 17
	MPP 7: 2 x 17
	MPP 8: 1 x 17
	MPP 9: 1 x 17
	MPP 10: 1 x 17
	MPP 11: 1 x 17
	MPP 12: 1 x 16
Inverter 2	
Model	SG50CX (v2)
Manufacturer	Sungrow Power Supply Co., Ltd.
Quantity	1
Sizing Factor	97,9 %
Configuration	MPP 1: 1 x 18
	MPP 2: 1 x 18
	MPP 3: 1 x 18
	MPP 4: 2 x 16
	MPP 5: 2 x 16

AC Mains

AC Mains

Number of Phases	3
Mains voltage between phase and neutral	230 V
Displacement Power Factor (cos phi)	+/- 1

Simulation Results

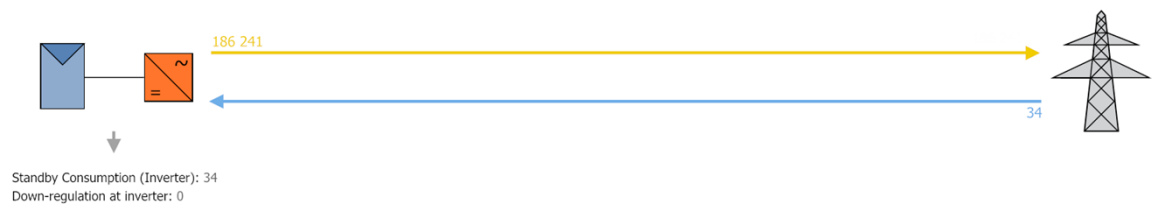
Results Total System

PV System

PV Generator Output	180,11 kWp
Spec. Annual Yield	1 033,85 kWh/kWp
Performance Ratio (PR)	91,18 %
Yield Reduction due to Shading	1,8 %
Grid Export	186 241 kWh/Year
Grid Export in the first year (incl. module degradation)	186 241 kWh/Year
Standby Consumption (Inverter)	34 kWh/Year
CO ₂ Emissions avoided	87 517 kg / year

Energy Flow Graph

Project: Miško urédija



All values in kWh
Small deviations in the totals can occur due to rounding
created with PV*SOL

Figure: Energy flow

PV System Energy Balance

PV System Energy Balance

Global radiation - horizontal	1 021,20 kWh/m²	
Deviation from standard spectrum	-10,21 kWh/m ²	-1,00 %
Ground Reflection (Albedo)	6,10 kWh/m ²	0,60 %
Orientation and inclination of the module surface	116,38 kWh/m ²	11,44 %
Module-independent shading	0,00 kWh/m ²	0,00 %
Reflection on the Module Interface	0,00 kWh/m ²	0,00 %
Global Radiation at the Module	1 133,47 kWh/m²	
	1 133,47 kWh/m ²	
	x 847,493 m ²	
	= 960 606,53 kWh	
Global PV Radiation	960 606,53 kWh	
Soiling	0,00 kWh	0,00 %
STC Conversion (Rated Efficiency of Module 21,26 %)	-756 389,32 kWh	-78,74 %
Rated PV Energy	204 217,21 kWh	
Module-specific Partial Shading	-2 642,56 kWh	-1,29 %
Low-light performance	-4 071,88 kWh	-2,02 %
Deviation from the nominal module temperature	-1 625,48 kWh	-0,82 %
Diodes	-222,98 kWh	-0,11 %
Mismatch (Manufacturer Information)	-3 913,09 kWh	-2,00 %
Mismatch (Configuration/Shading)	-508,34 kWh	-0,27 %
PV Energy (DC) without inverter down-regulation	191 232,89 kWh	
Failing to reach the DC start output	0,00 kWh	0,00 %
Down-regulation on account of the MPP Voltage Range	-0,36 kWh	0,00 %
Down-regulation on account of the max. DC Current	-0,17 kWh	0,00 %
Down-regulation on account of the max. DC Power	0,00 kWh	0,00 %
Down-regulation on account of the max. AC Power/cos phi	0,00 kWh	0,00 %
MPP Matching	-23,56 kWh	-0,01 %
PV energy (DC)	191 208,80 kWh	
Energy at the Inverter Input	191 208,80 kWh	
Input voltage deviates from rated voltage	-32,04 kWh	-0,02 %
DC/AC Conversion	-4 936,10 kWh	-2,58 %
Standby Consumption (Inverter)	-34,29 kWh	-0,02 %
Total Cable Losses	0,00 kWh	0,00 %
PV energy (AC) minus standby use	186 206,38 kWh	
PV Generator Energy (AC grid)	186 240,66 kWh	

Data Sheets

PV Module Data Sheet

PV Module: Q.PEAK DUO M-G11S+ 415 Rev1 (v1)

Manufacturer	Hanwha Q.CELLS
Available	Yes

Electrical Data

Cell Type	Si monocrystalline
Half-cell module	Yes
Cell Count	108
Number of Bypass Diodes	3
Loss voltage per bypass diode	1 V
Integrated power optimizer	No
Only Transformer Inverters suitable	No

I/V Characteristics at STC

MPP Voltage	31,05 V
MPP Current	13,37 A
Open Circuit Voltage	37,14 V
Short-Circuit Current	13,99 A
Increase open circuit voltage before stabilisation	0 %
Nominal output	415 W
Fill Factor	79,9 %
Efficiency	21,26 %

I/V Part Load Characteristics

Values source	Manufacturer/user-created
Irradiance	200 W/m ²
Voltage in MPP at Part Load	29,84 V
Current in MPP at Part Load	2,671 A
Open Circuit Voltage (Part Load)	34,72 V
Short Circuit Current at Part Load	2,8 A

Additional Parameters

Temperature Coefficient of Voc	-100,1 mV/K
Temperature Coefficient of Isc	5,6 mA/K
Temperature Coefficient of Pmpp	-0,34 %/K
Incident Angle Modifier (IAM)	100 %
Maximum System Voltage	1000 V

Mechanical Data

Width	1134 mm
Height	1722 mm
Depth	30 mm
Frame Width	13 mm
Weight	21,1 kg

Inverter Data Sheet

Inverter: SG125CX (v2)

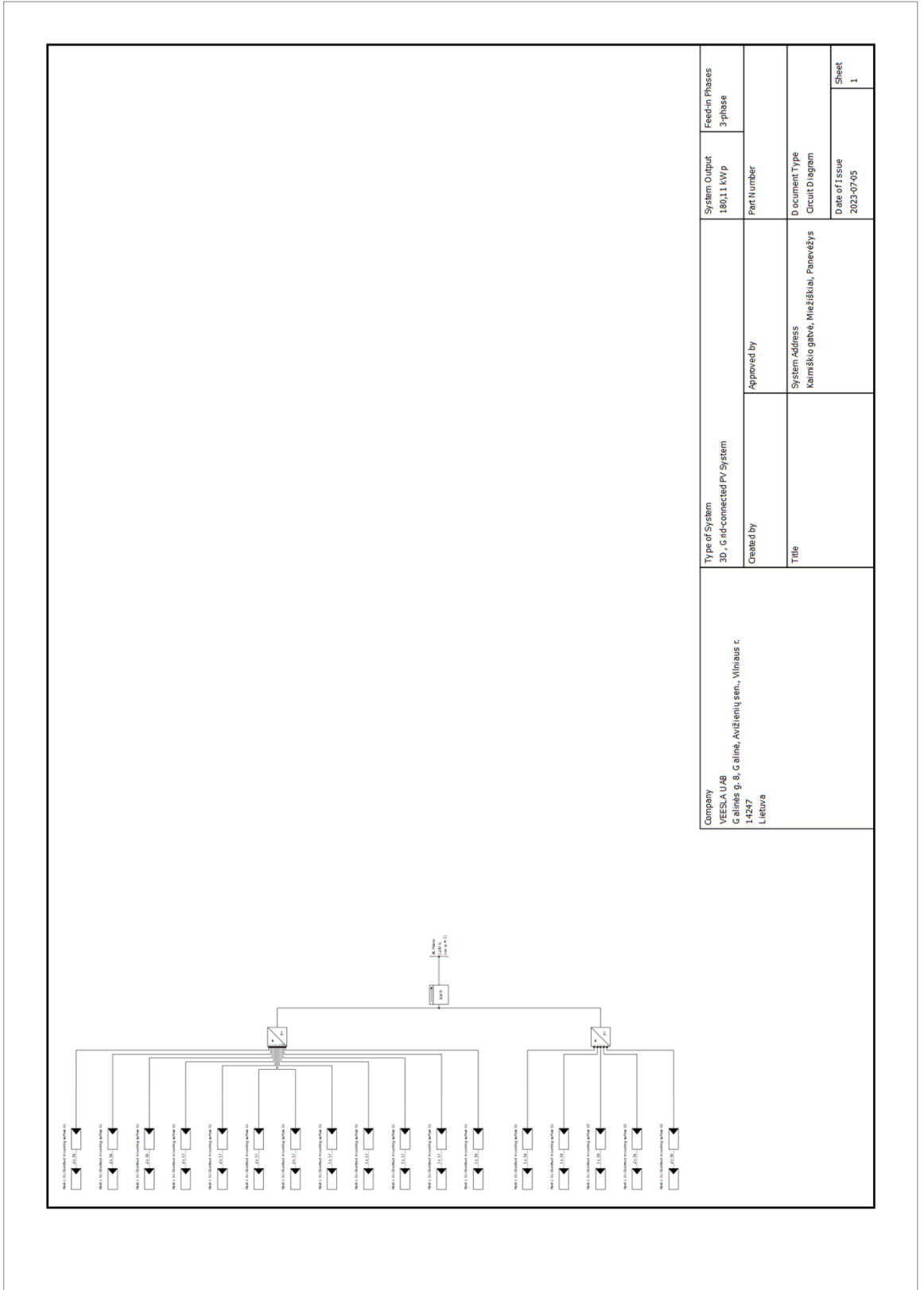
Manufacturer	Sungrow Power Supply Co., Ltd.
Available	Yes
Electrical data - DC	
DC nominal output	125 kW
Max. DC Power	175 kW
Nom. DC Voltage	600 V
Max. Input Voltage	1040 V
Max. Input Current	360 A
Max. short circuit current	480 A
Number of DC Inlets	24
Electrical data - AC	
AC Power Rating	125 kW
Max. AC Power	125 kVA
Number of Phases	3
With Transformer	No
Electrical data - other	
Change in Efficiency when Input Voltage deviates from Rated Voltage	0,02 %/100V
Min. Feed-in Power	20 W
Standby Consumption	6 W
Night Consumption	6 W
MPP Tracker	
Output Range < 20% of Power Rating	99,9 %
Output Range > 20% of Power Rating	100 %
Count of MPP Trackers	12
MPP Tracker 1-12	
Max. Input Current	30 A
Max. short circuit current	35 A
Max. Input Power	24 kW
Min. MPP Voltage	200 V
Max. MPP Voltage	1000 V

Inverter: SG50CX (v2)

Manufacturer	Sungrow Power Supply Co., Ltd.
Available	Yes
Electrical data - DC	
DC nominal output	50 kW
Max. DC Power	75 kW
Nom. DC Voltage	585 V
Max. Input Voltage	1100 V
Max. Input Current	130 A
Max. short circuit current	130 A
Number of DC Inlets	10
Electrical data - AC	
AC Power Rating	50 kW
Max. AC Power	55 kVA
Number of Phases	3
With Transformer	No
Electrical data - other	
Change in Efficiency when Input Voltage deviates from Rated Voltage	0,02 %/100V
Min. Feed-in Power	2 W
Standby Consumption	2 W
Night Consumption	2 W
MPP Tracker	
Output Range < 20% of Power Rating	99,9 %
Output Range > 20% of Power Rating	100 %
Count of MPP Trackers	5
MPP Tracker 1-5	
Max. Input Current	26 A
Max. short circuit current	26 A
Max. Input Power	22,1 kW
Min. MPP Voltage	200 V
Max. MPP Voltage	1000 V

Plans and parts list

Circuit Diagram



Company VEESLA UAB G alinės g. 8, C ailinė, Avižienių sen., Vilnius r. 1-4247 Lietuva	Type of System 3D, Grid-connected PV System	System Output 180.11 kWp	Feed-in Phases 3-phase
	Created by	Approved by	Part Number
Title		Document Type Circuit Diagram	Sheet 1
		System Address Kaimiško gatvė, Miezėškai, Panevėžys	
		Date of Issue 2023-07-05	

Figure: Circuit Diagram

Overview plan

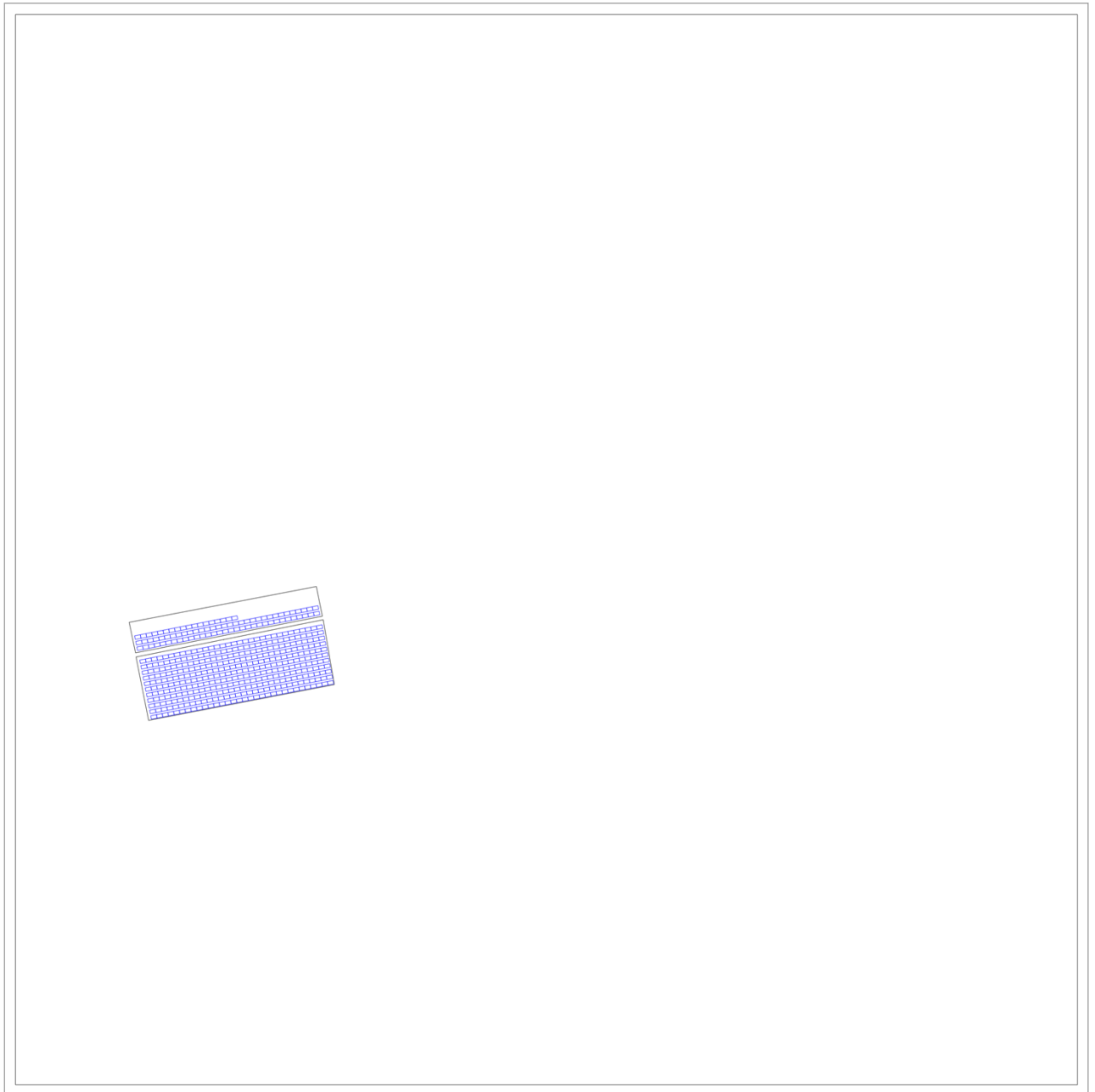


Figure: Overview plan

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		Hanwha Q.CELLS	Q.PEAK DUO M-G11S+ 415 Rev1	434	Piece
2	Inverter		Sungrow Power Supply Co., Ltd.	SG125CX	1	Piece
3	Inverter		Sungrow Power Supply Co., Ltd.	SG50CX	1	Piece
4	Components			Feed-in Meter	1	Piece

Screenshots, 3D Design Environment



Figure: Screenshot04



Figure: pietūs



Figure: Screenshot06

Configuration

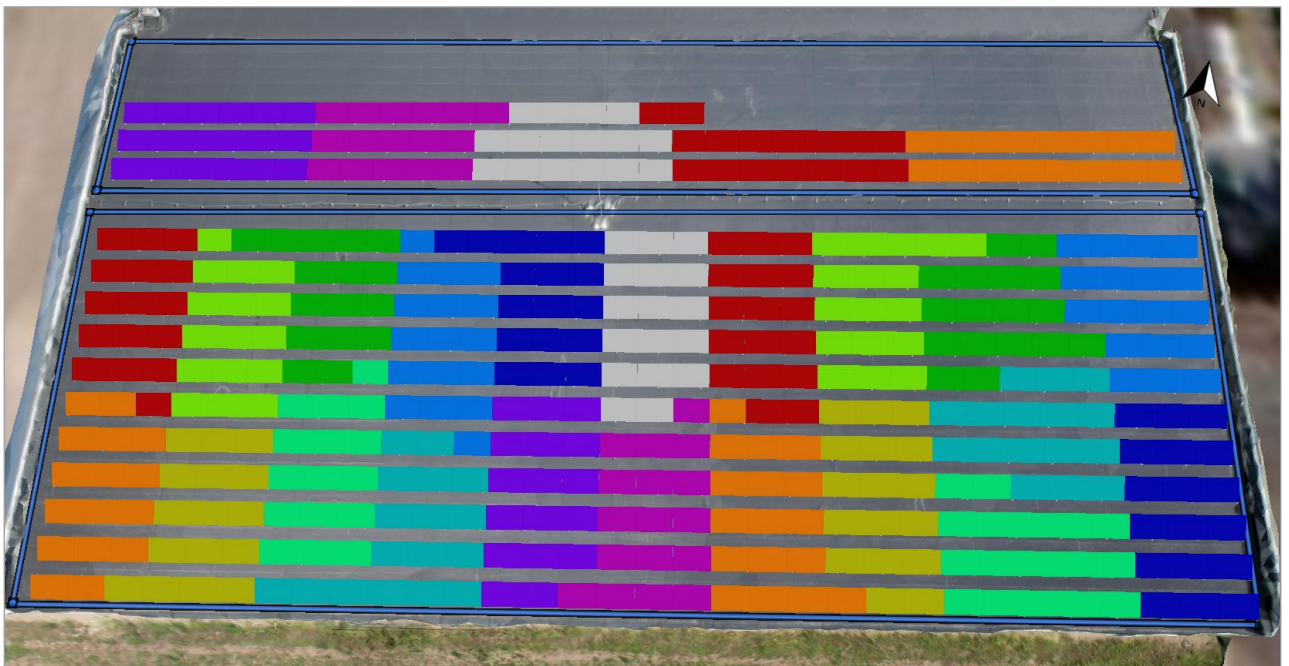


Figure: Screenshot01

