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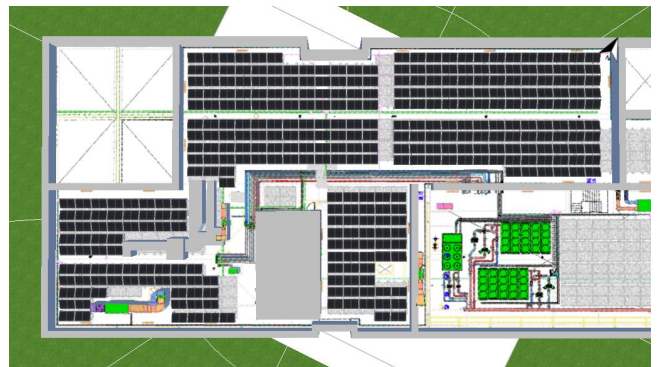
Project Name: Circle Square 3

25/11/2024

Your PV system from Green Leaf Engineering

Address of Installation

Manchester,
United Kindom,
M1 1AD



Project Description:
Photovoltaic Roof System

Project Overview



Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System with Electrical Appliances

Climate Data	Manchester, GBR (2001 - 2020)
Values source	Meteonorm 8.2(i)
PV Generator Output	162.15 kWp
PV Generator Surface	687.4 m ²
Number of PV Modules	345
Number of Inverters	3

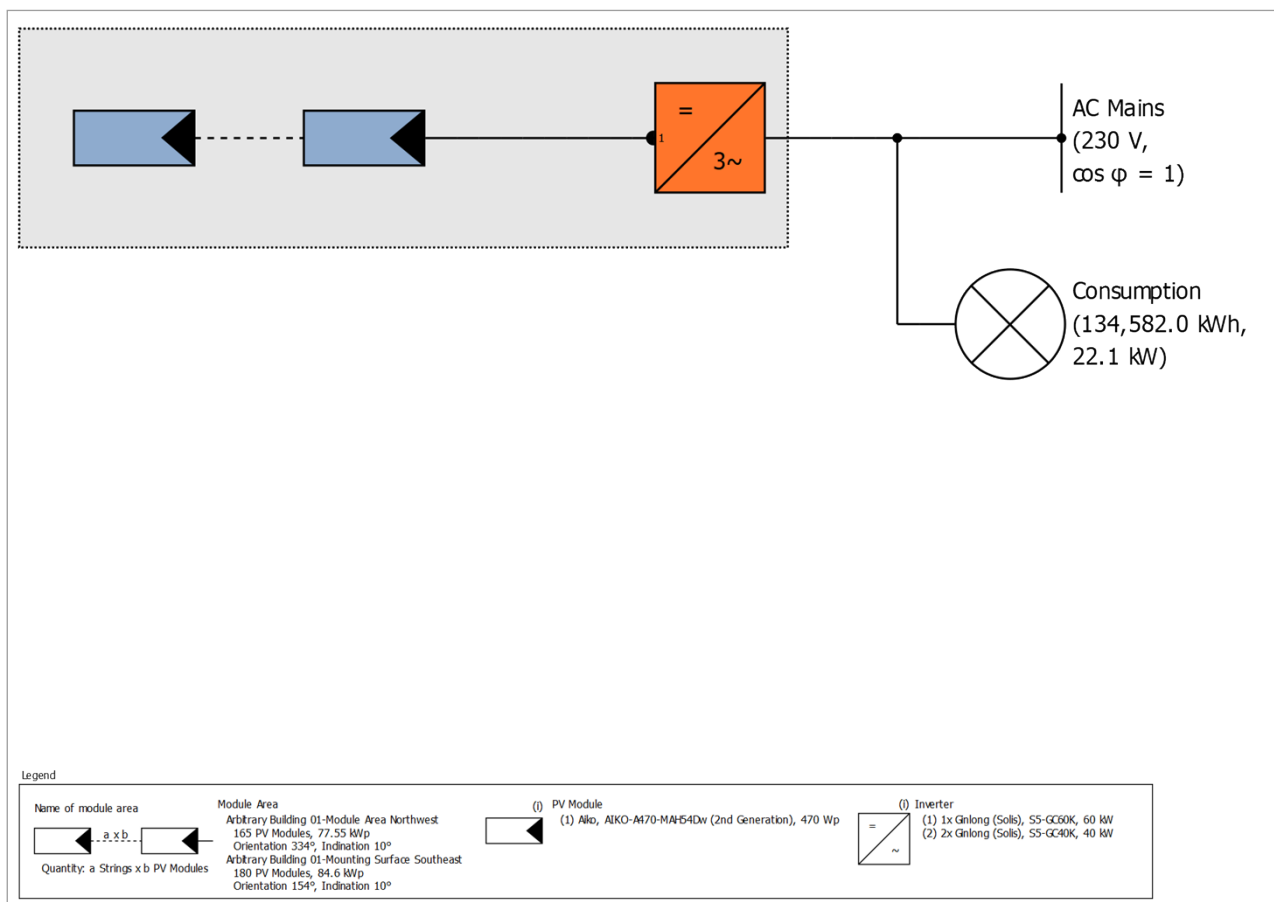


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	162.15 kWp
Spec. Annual Yield	787.62 kWh/kWp
Performance Ratio (PR)	81.57 %
Yield Reduction due to Shading	15.3 %
PV Generator Energy (AC grid)	127,754 kWh/Year
Own Consumption	58,641 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	69,114 kWh/Year
Own Power Consumption	45.9 %
CO ₂ Emissions avoided	60,025 kg / year
Level of Self-sufficiency	43.6 %

Financial Analysis

Your Gain

Total investment costs	194,580.00 £
Internal Rate of Return (IRR)	5.19 %
Amortization Period	16.0 Years
Electricity Production Costs	0.0997 £/kWh
Energy Balance/Feed-in Concept	Surplus Feed-in

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 with Electrical Appliances
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Climate Data

Location	Manchester, GBR (2001 - 2020)
Values source	Meteonorm 8.2(i)
Data resolution	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

Consumption

Total Consumption	134582 kWh
Office building 16000 m ²	134582 kWh
Load Peak	22.1 kW

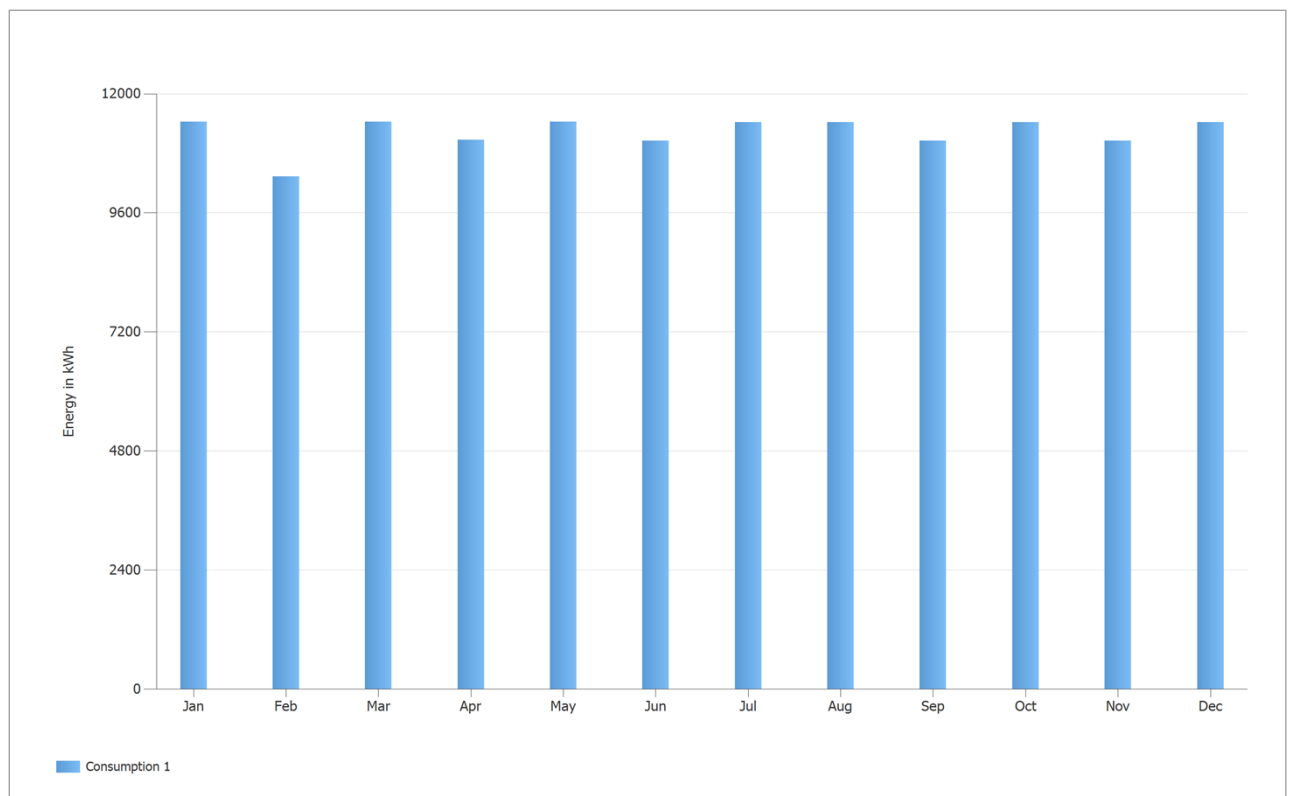


Figure: Consumption

Module Areas

1. Module Area - Arbitrary Building 01-Module Area Northwest

PV Generator, 1. Module Area - Arbitrary Building 01-Module Area Northwest

Name	Arbitrary Building 01-Module Area Northwest
PV Modules	165 x AIKO-A470-MAH54Dw (2nd Generation) (v1)
Manufacturer	Aiko
Inclination	10 °
Orientation	Northwest 334 °
Installation Type	Mounted - Roof
PV Generator Surface	328.8 m ²

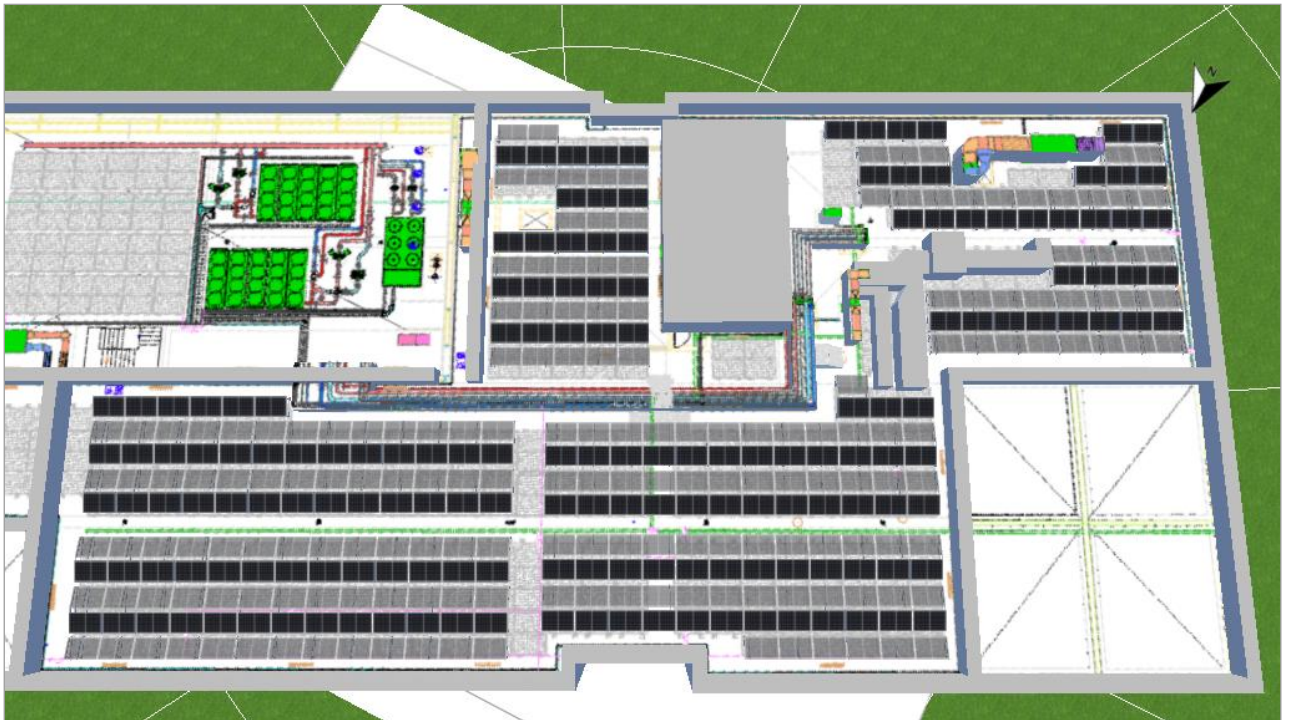


Figure: 1. Module Area - Arbitrary Building 01-Module Area Northwest

2. Module Area - Arbitrary Building 01-Mounting Surface Southeast

PV Generator, 2. Module Area - Arbitrary Building 01-Mounting Surface Southeast

Name	Arbitrary Building 01-Mounting Surface Southeast
PV Modules	180 x AIKO-A470-MAH54Dw (2nd Generation) (v1)
Manufacturer	Aiko
Inclination	10 °
Orientation	Southeast 154 °
Installation Type	Mounted - Roof
PV Generator Surface	358.6 m ²

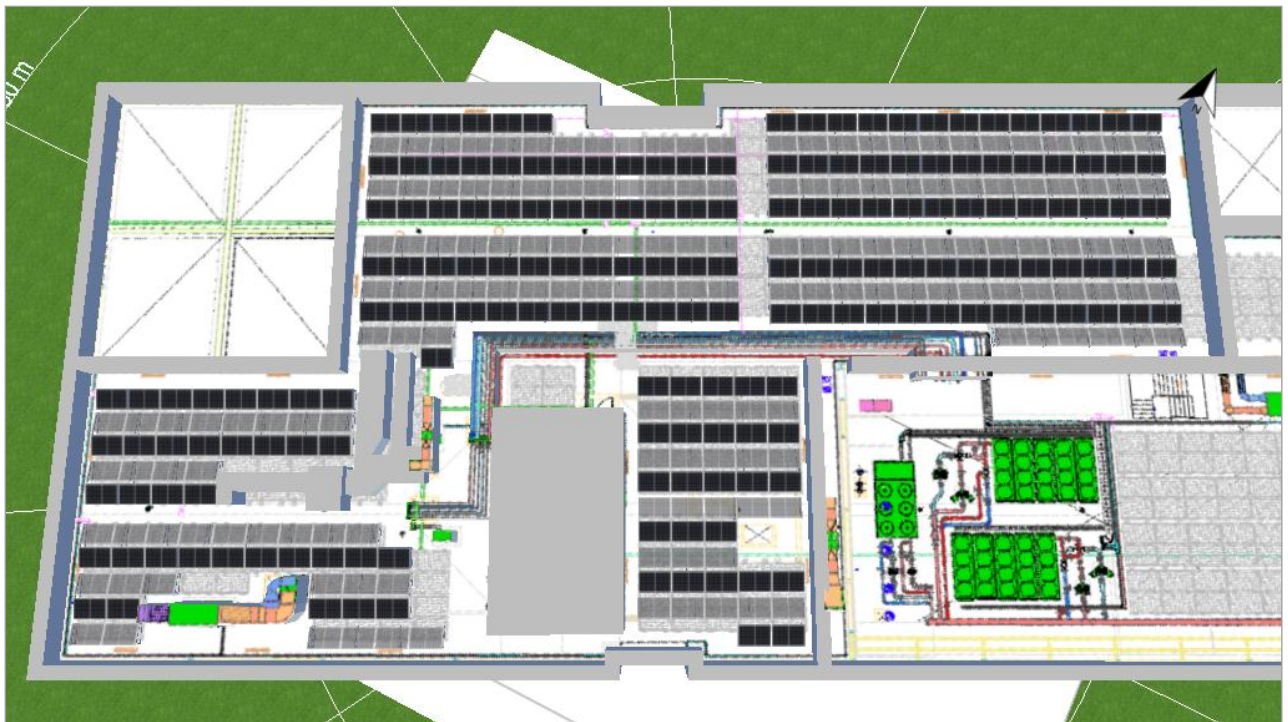


Figure: 2. Module Area - Arbitrary Building 01-Mounting Surface Southeast

Inverter configuration

Configuration 1

Module Area	Arbitrary Building 01-Module Area Northwest
Inverter 1	
Model	S5-GC60K (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	129.3 %
Configuration	MPP 1: 2 x 14
	MPP 2: 1 x 15
	MPP 3: 2 x 12
	MPP 4: 2 x 22
	MPP 5: 2 x 11
	MPP 6: 2 x 16

Circle Square 3

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Configuration 2

Module Area	Arbitrary Building 01-Mounting Surface Southeast
Inverter 1	
Model	S5-GC40K (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	105.7 %
Configuration	MPP 1: 2 x 15
	MPP 2: 2 x 12
	MPP 3: 1 x 21
	MPP 4: 1 x 15
Inverter 2	
Model	S5-GC40K (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	105.7 %
Configuration	MPP 1: 2 x 13
	MPP 2: 2 x 13
	MPP 3: 2 x 13
	MPP 4: 1 x 12

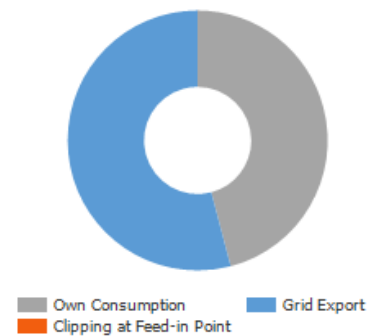
Simulation Results

Results Total System

PV System

PV Generator Output	162.15 kWp
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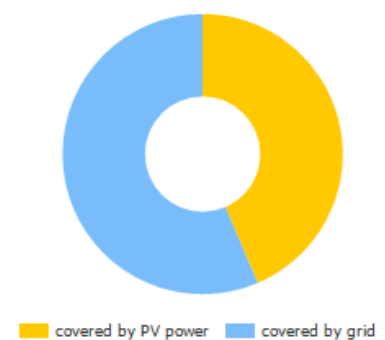
PV Generator Energy (AC grid)



Appliances

Appliances	134,582 kWh/Year
Standby Consumption (Inverter)	42 kWh/Year
Total Consumption	134,624 kWh/Year
covered by PV power	58,641 kWh/Year
covered by grid	75,983 kWh/Year
Solar Fraction	43.6 %

Total Consumption

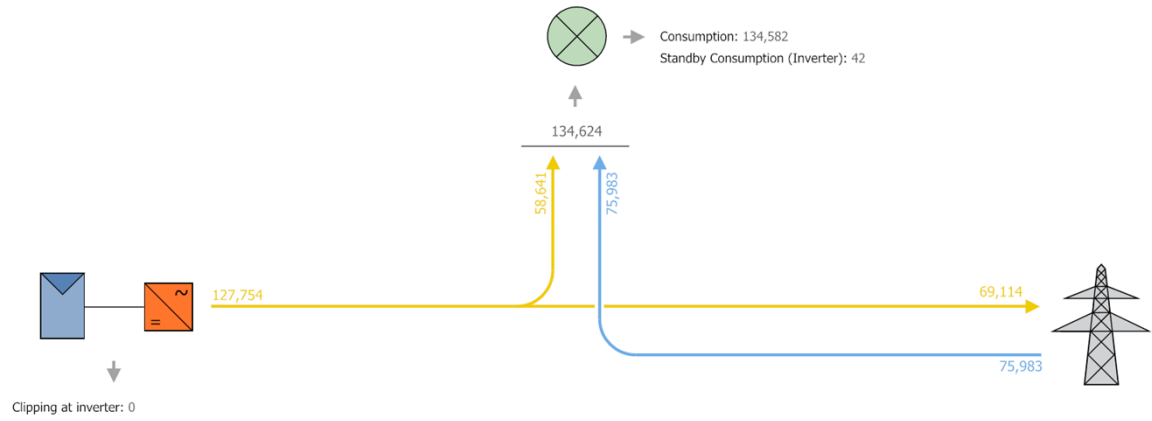


Level of Self-sufficiency

Total Consumption	134,624 kWh/Year
covered by grid	75,983 kWh/Year
Level of Self-sufficiency	43.6 %

Energy Flow Graph

Project: Circle Square 3



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

Figure: Energy flow

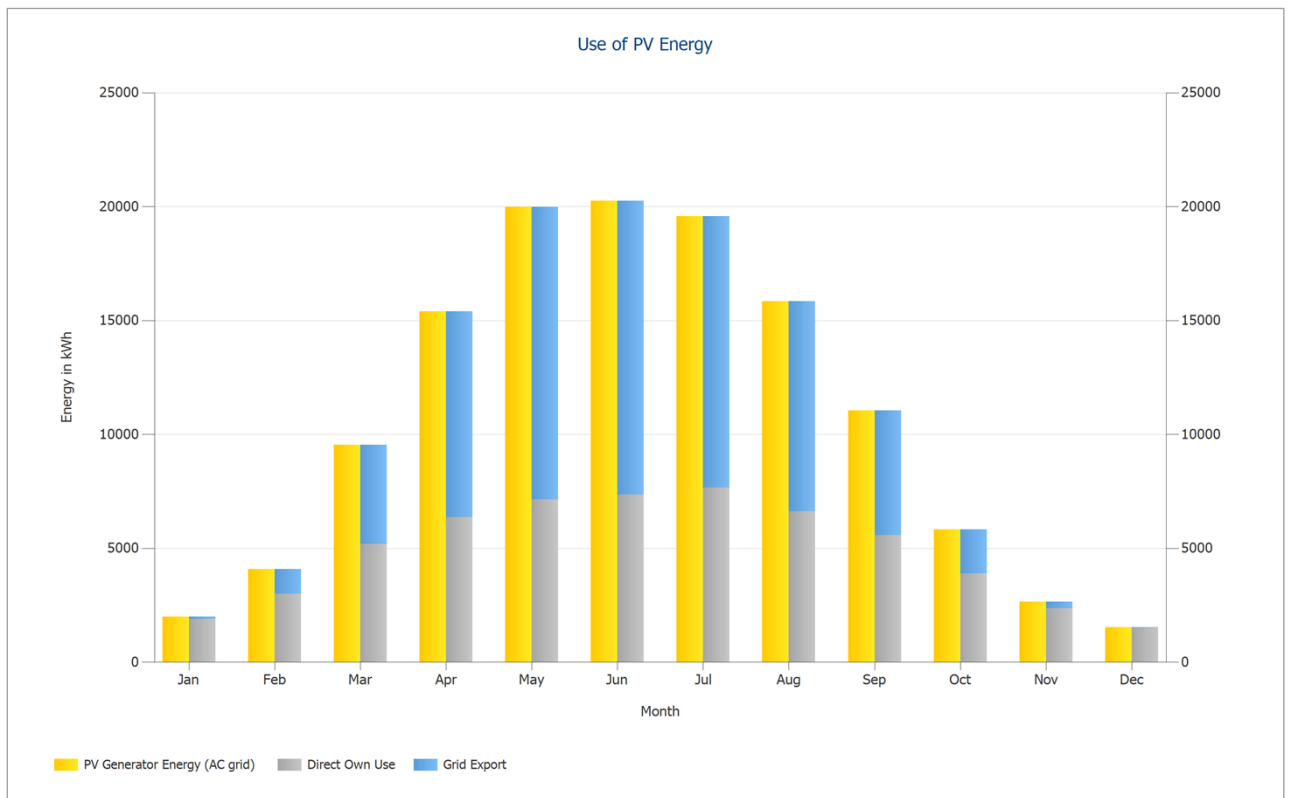


Figure: Use of PV Energy

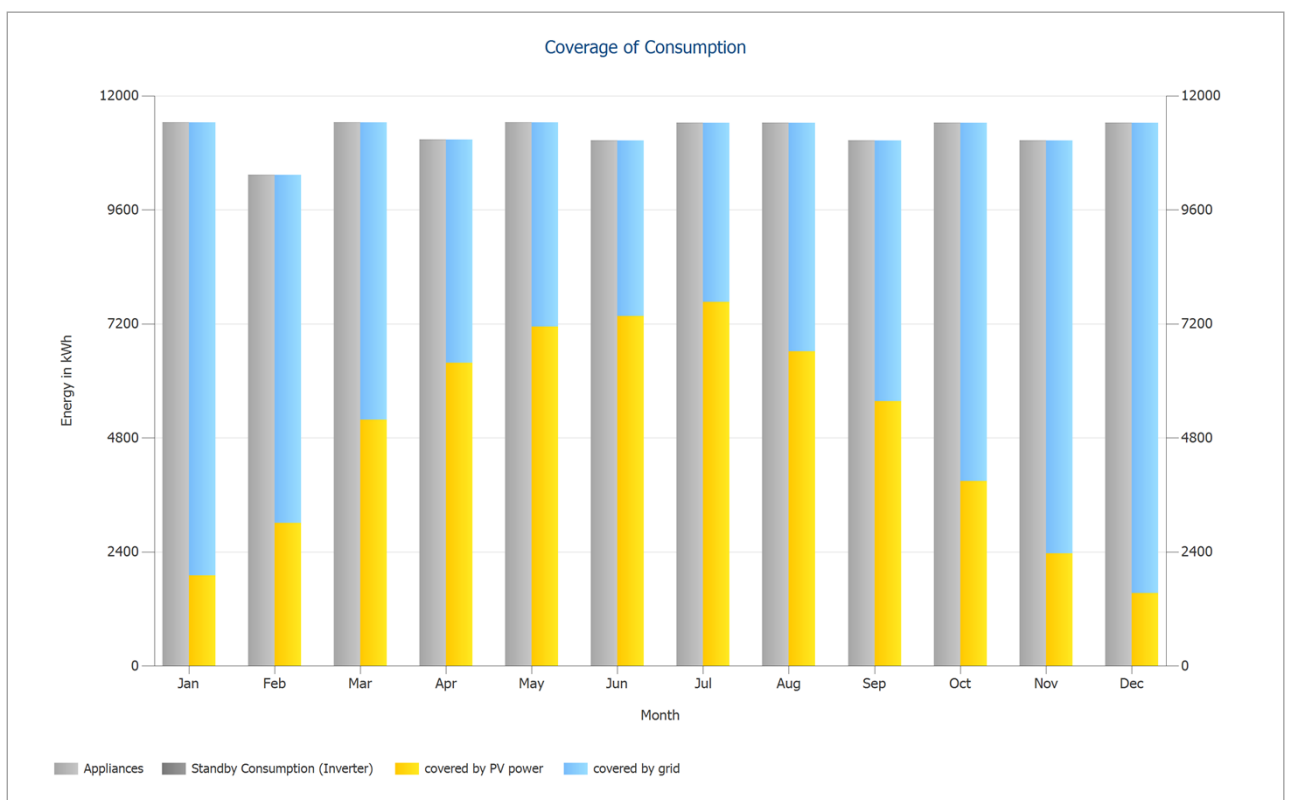


Figure: Coverage of Consumption

Plans and parts list

Overview plan

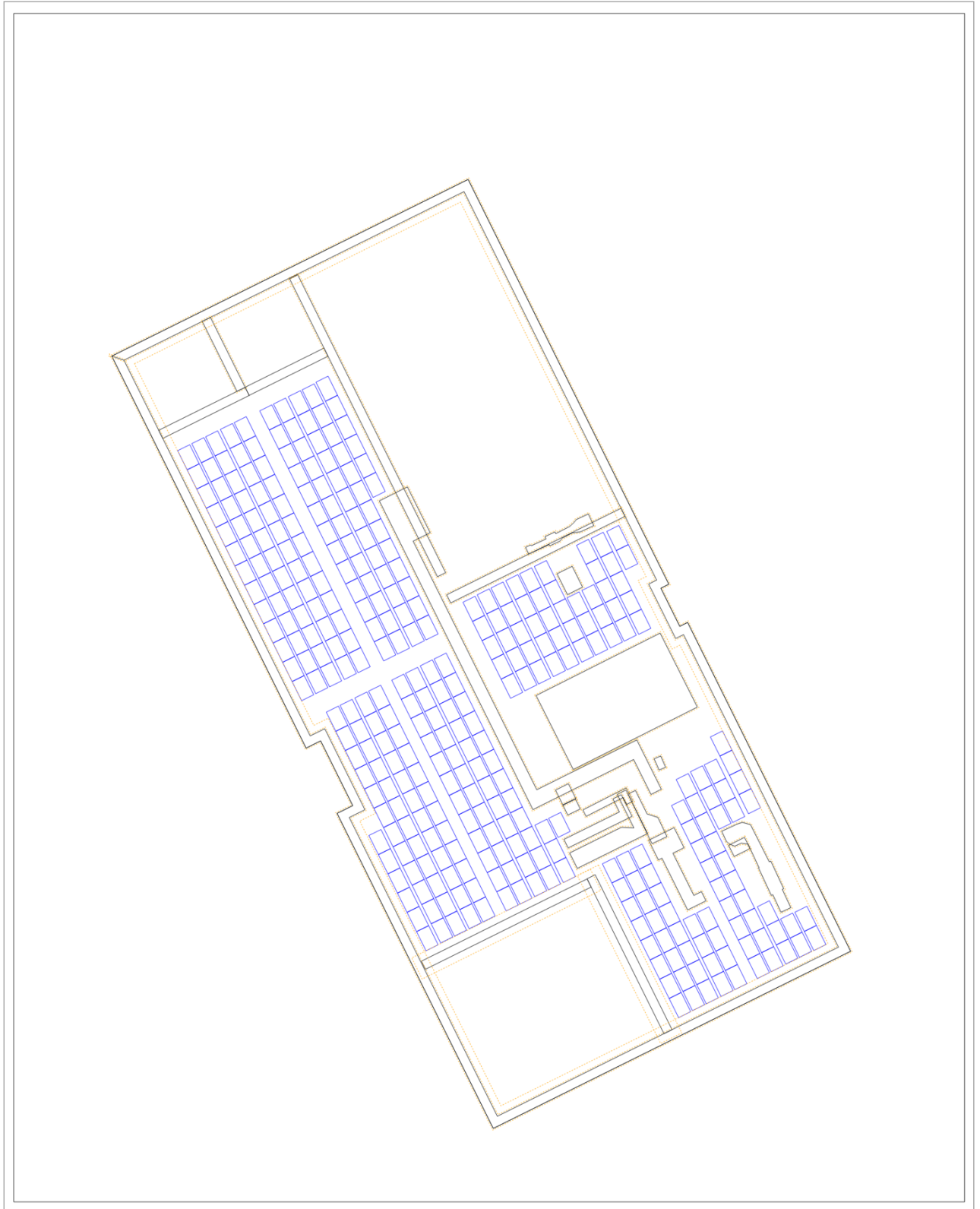


Figure: Overview plan

Dimensioning Plan

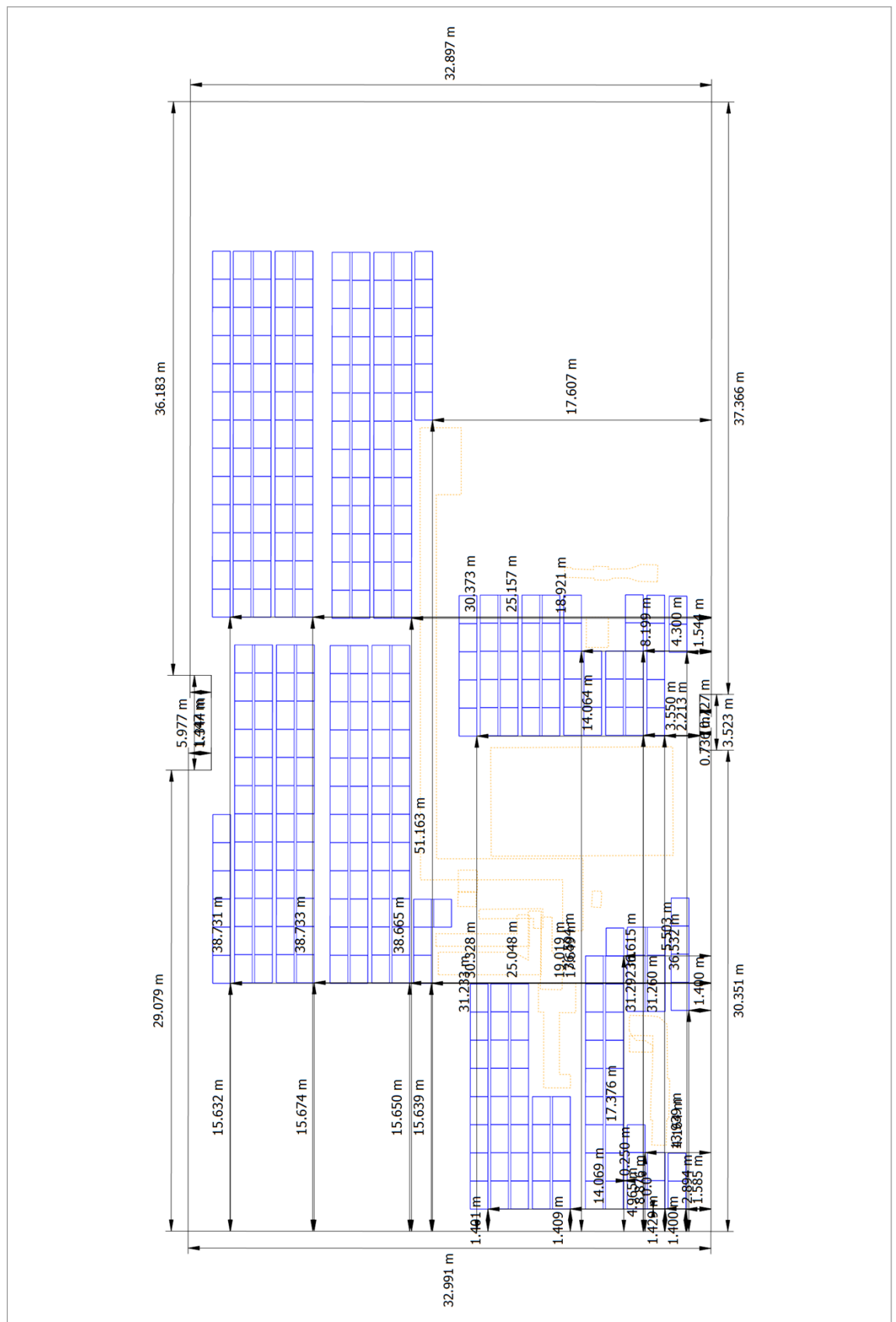


Figure: Arbitrary Building O1 - Mounting Surface Southeast

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		Aiko	AIKO-A470- MAH54Dw (2nd Generation)	345	Piece
2	Inverter		Ginlong (Solis)	S5-GC60K	1	Piece
3	Inverter		Ginlong (Solis)	S5-GC40K	2	Piece