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M22 9AF
United Kingdom

Project Name: Sainsbury's - Hinckley

07/11/2024

Documentation

Customer Details

Company	Sainsbury's
Customer Number	
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Address	
Phone	
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E-Mail	

Project Data

Project Name	Sainsbury's - Hinckley
Offer no.	
Project Designer	JB
Address	Sainsbury's, 20 Rugby Rd, Hinckley LE10 0QG

Sainsbury's

Project Description:
Rooftop PV

Project Overview



Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System with Electrical Appliances

Climate Data	Hinckley, GBR (2001 - 2020)
Values source	Meteonorm 8.2(i)
PV Generator Output	405.45 kWp
PV Generator Surface	1,906.2 m ²
Number of PV Modules	954
Number of Inverters	4

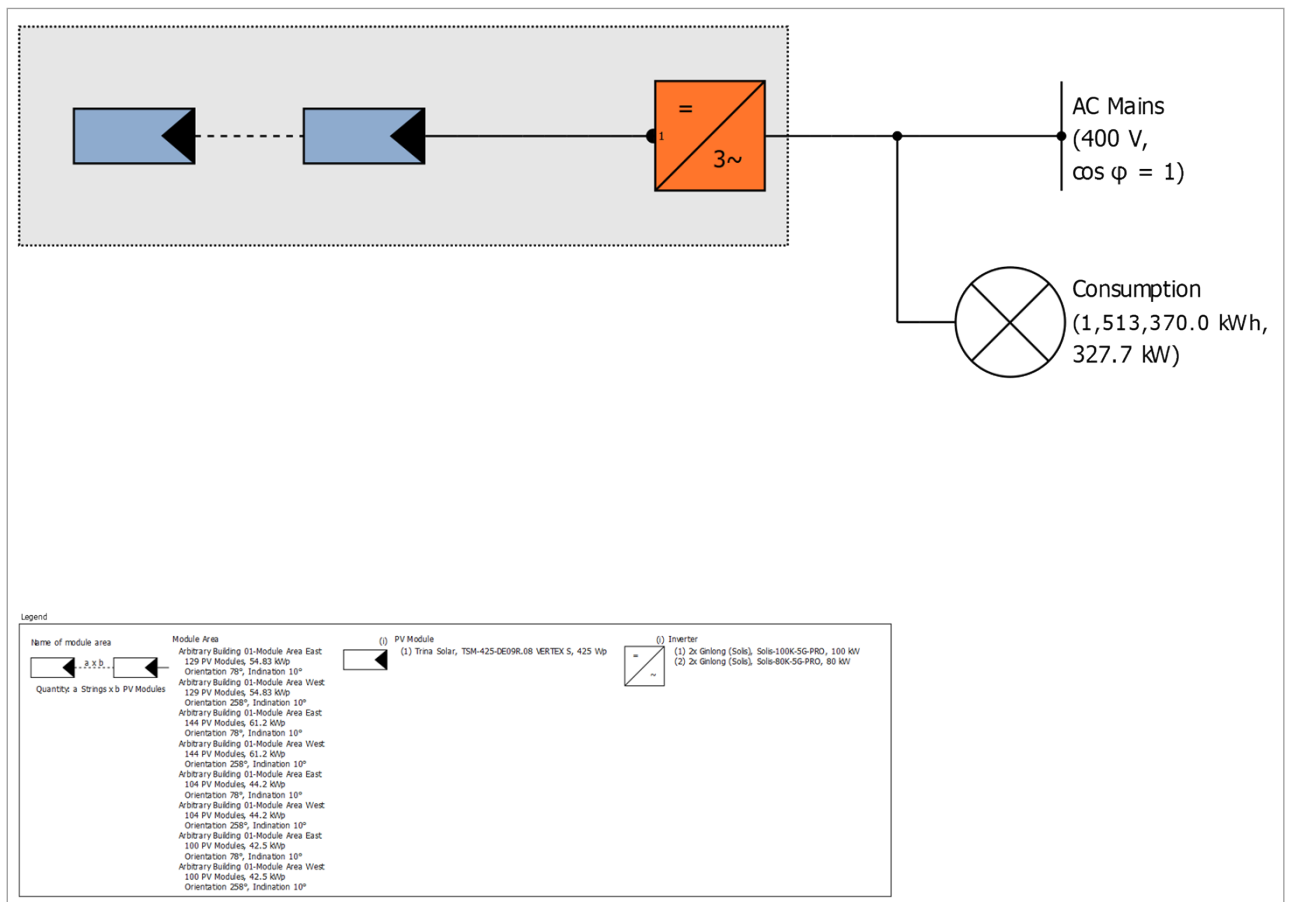


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	405.45 kWp
Spec. Annual Yield	889.78 kWh/kWp
Performance Ratio (PR)	91.67 %
Yield Reduction due to Shading	1.1 %
PV Generator Energy (AC grid)	360,793 kWh/Year
Own Consumption	337,255 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	23,537 kWh/Year
Own Power Consumption	93.5 %
CO ₂ Emissions avoided	81,172 kg / year
Level of Self-sufficiency	22.3 %

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
Start of Operation	01/01/2025

Climate Data

Location	Hinckley, GBR (2001 - 2020)
Values source	Meteonorm 8.2(i)
Resolution of the data	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Reindl reduced
- Irradiance onto tilted surface	Perez

Consumption

Total Consumption	1513370 kWh
Hinckley	1513370 kWh
Load Peak	327.7 kW

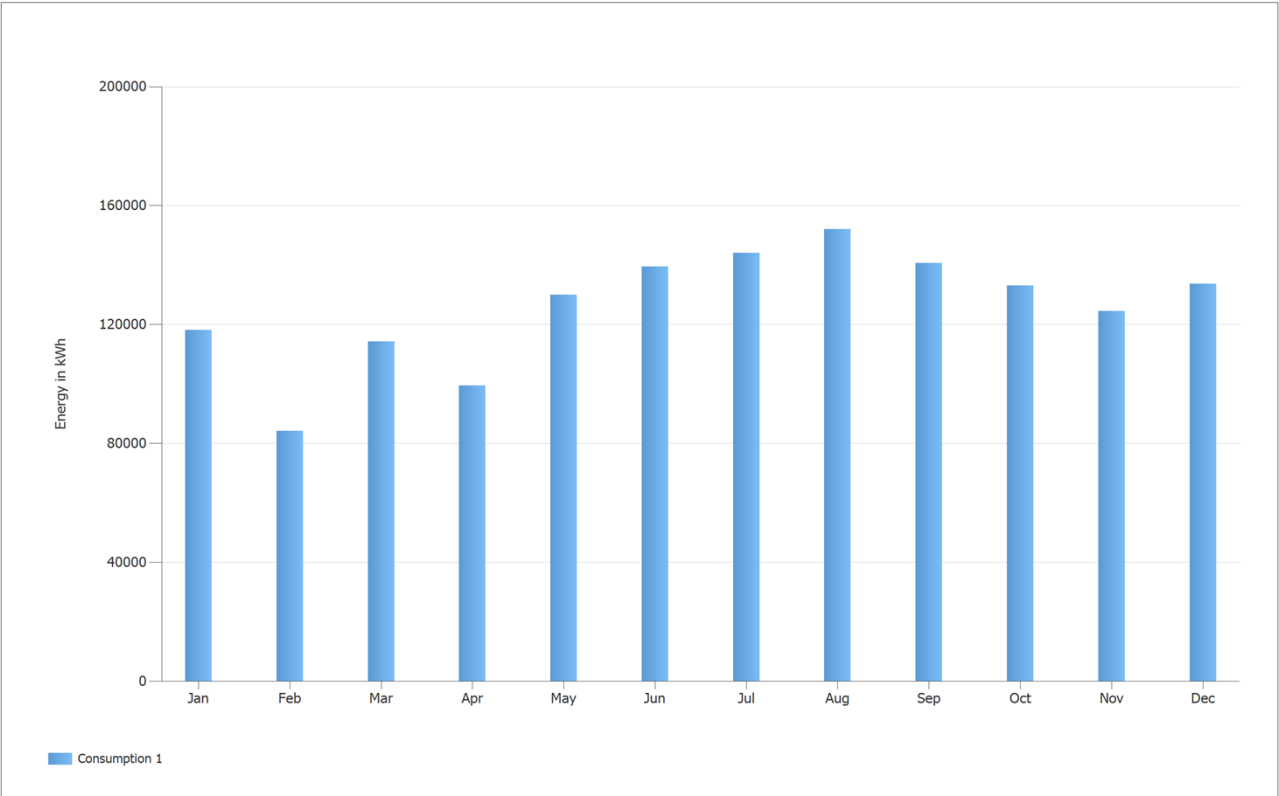


Figure: Consumption

Module Areas

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

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

Name	Arbitrary Building 01-Module Area East
PV Modules	129 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	East 78 °
Installation Type	Mounted - Roof
PV Generator Surface	257.8 m ²



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

Degradation of Module, 1. Module Area - Arbitrary Building 01-Module Area East

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

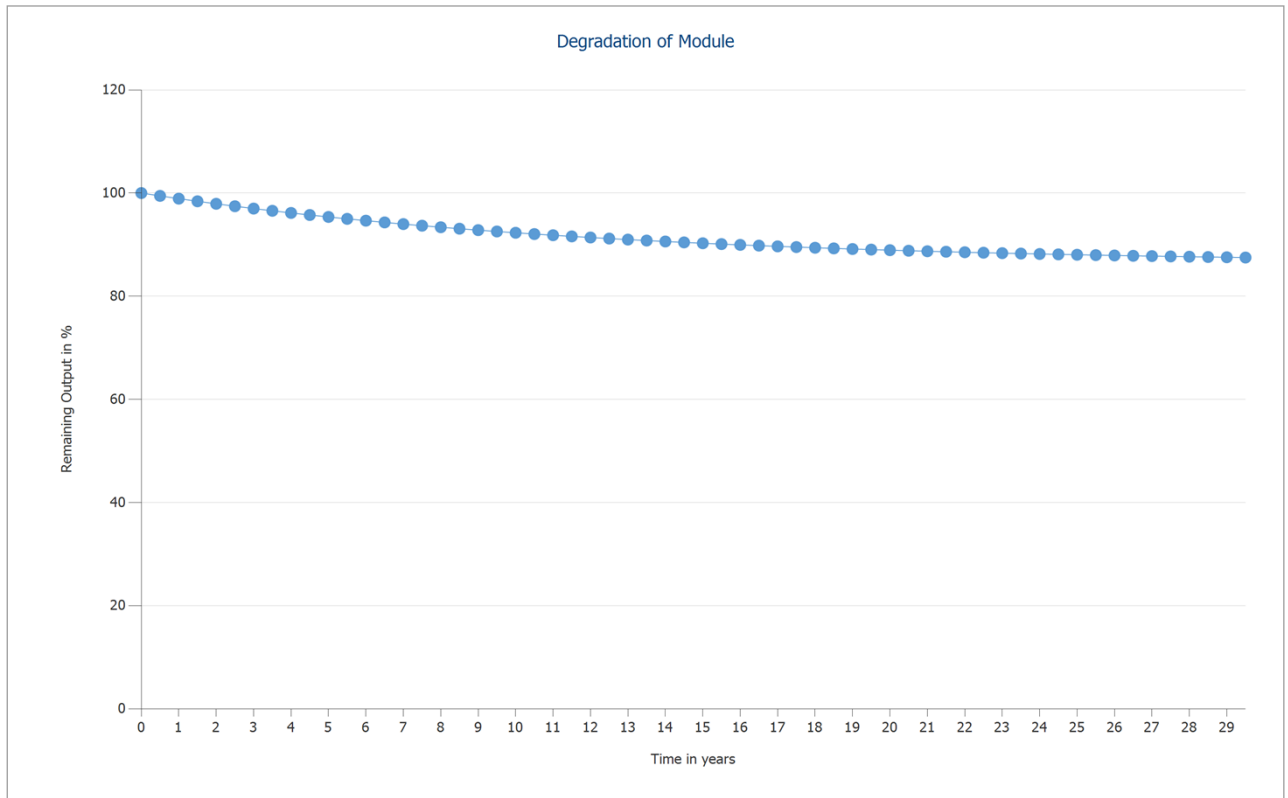


Figure: Degradation of Module, 1. Module Area - Arbitrary Building 01-Module Area East

2. Module Area - Arbitrary Building 01-Module Area West

PV Generator, 2. Module Area - Arbitrary Building 01-Module Area West

Name	Arbitrary Building 01-Module Area West
PV Modules	129 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	West 258 °
Installation Type	Mounted - Roof
PV Generator Surface	257.8 m ²

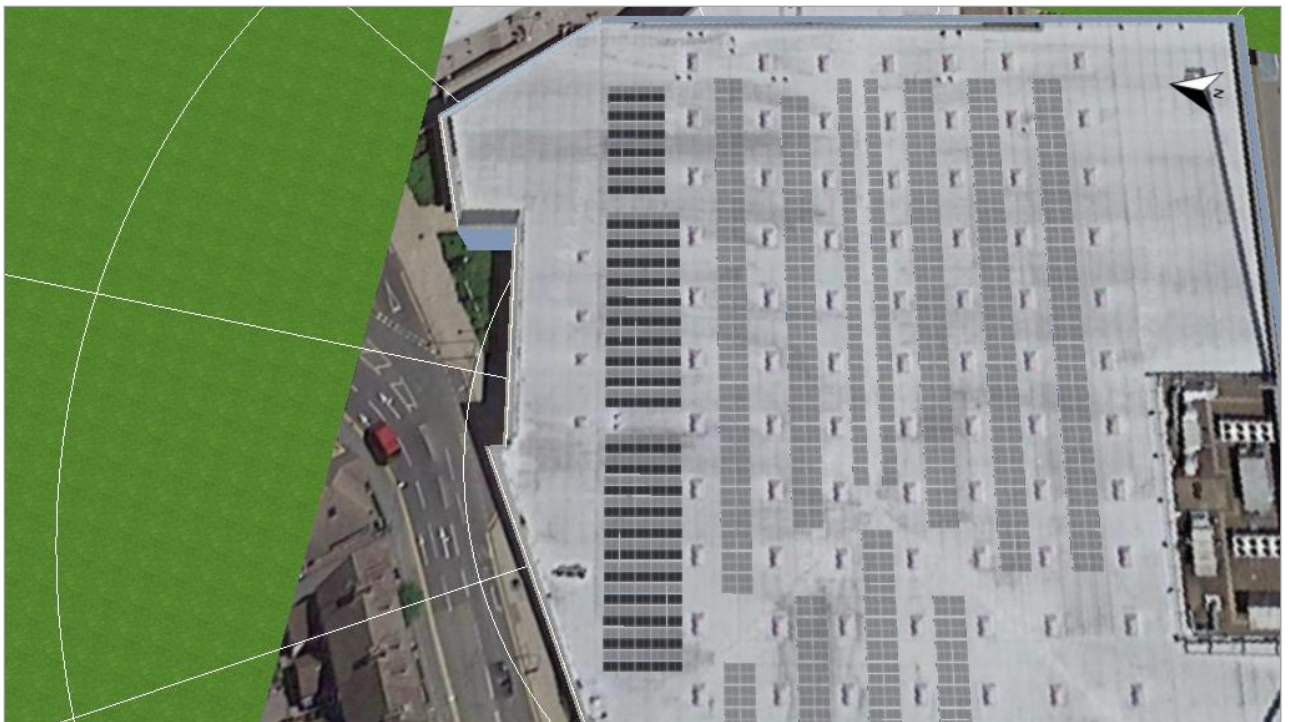


Figure: 2. Module Area - Arbitrary Building 01-Module Area West

Degradation of Module, 2. Module Area - Arbitrary Building 01-Module Area West

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

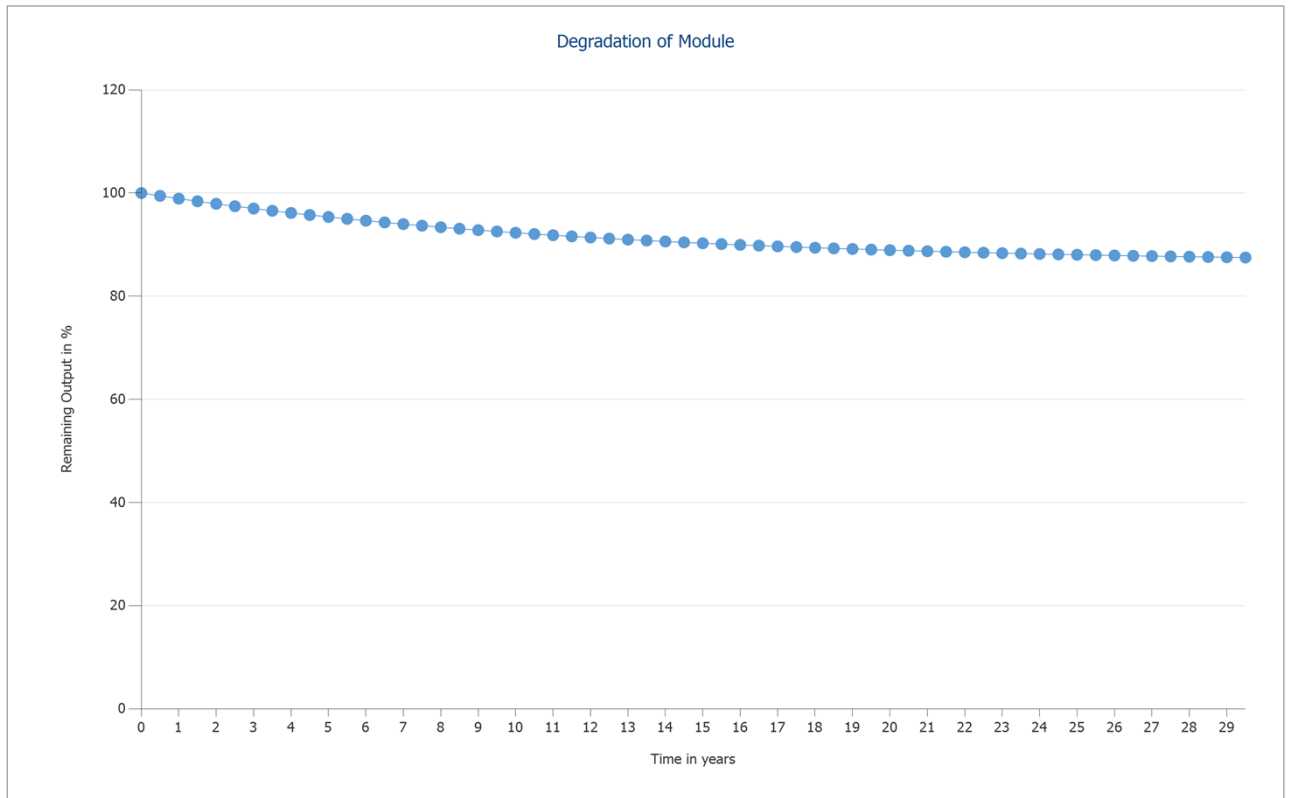


Figure: Degradation of Module, 2. Module Area - Arbitrary Building 01-Module Area West

3. Module Area - Arbitrary Building 01-Module Area East

PV Generator, 3. Module Area - Arbitrary Building 01-Module Area East

Name	Arbitrary Building 01-Module Area East
PV Modules	144 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	East 78 °
Installation Type	Mounted - Roof
PV Generator Surface	287.7 m ²

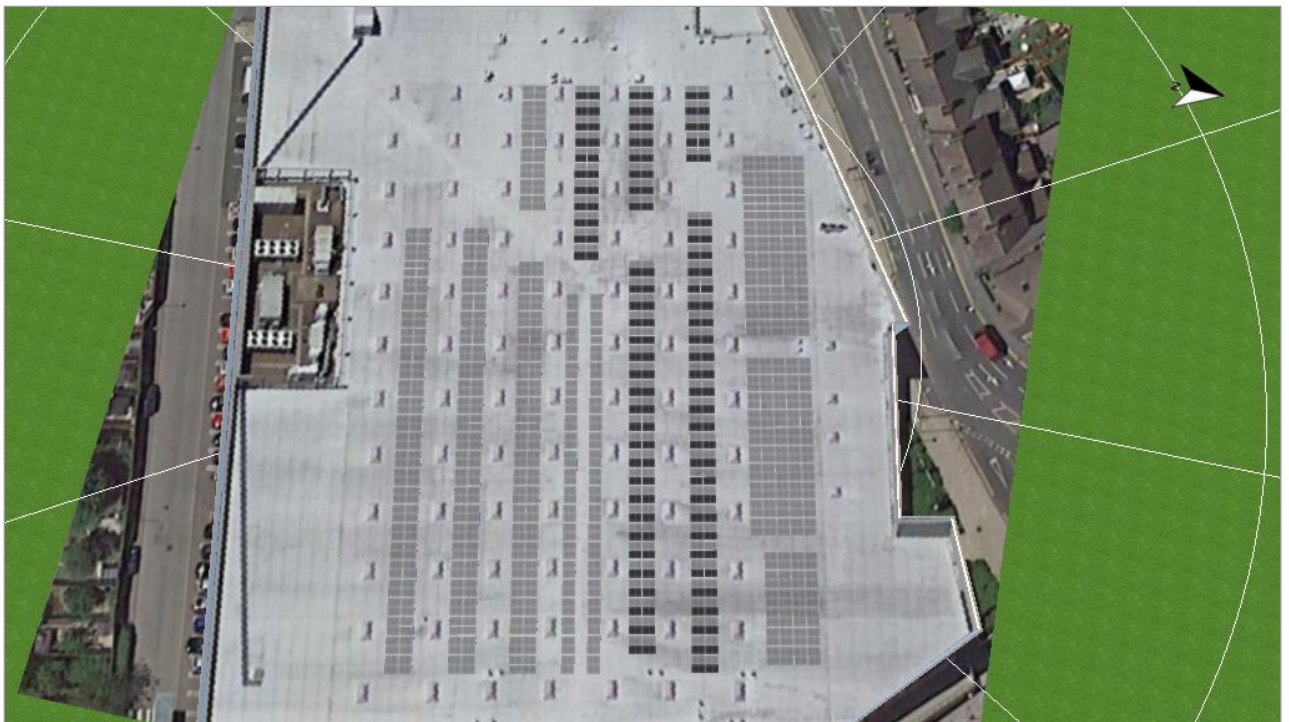


Figure: 3. Module Area - Arbitrary Building 01-Module Area East

Degradation of Module, 3. Module Area - Arbitrary Building 01-Module Area East

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

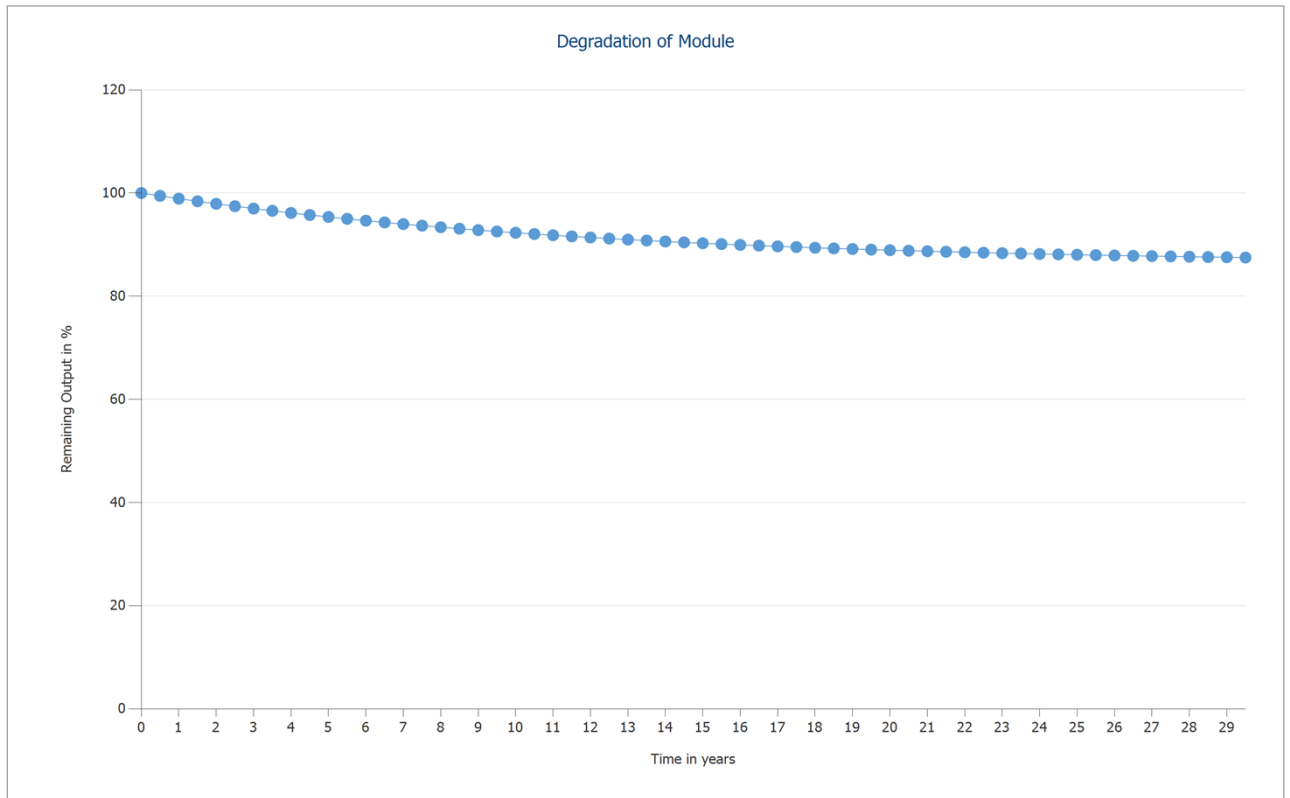


Figure: Degradation of Module, 3. Module Area - Arbitrary Building 01-Module Area East

4. Module Area - Arbitrary Building 01-Module Area West

PV Generator, 4. Module Area - Arbitrary Building 01-Module Area West

Name	Arbitrary Building 01-Module Area West
PV Modules	144 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	West 258 °
Installation Type	Mounted - Roof
PV Generator Surface	287.7 m ²

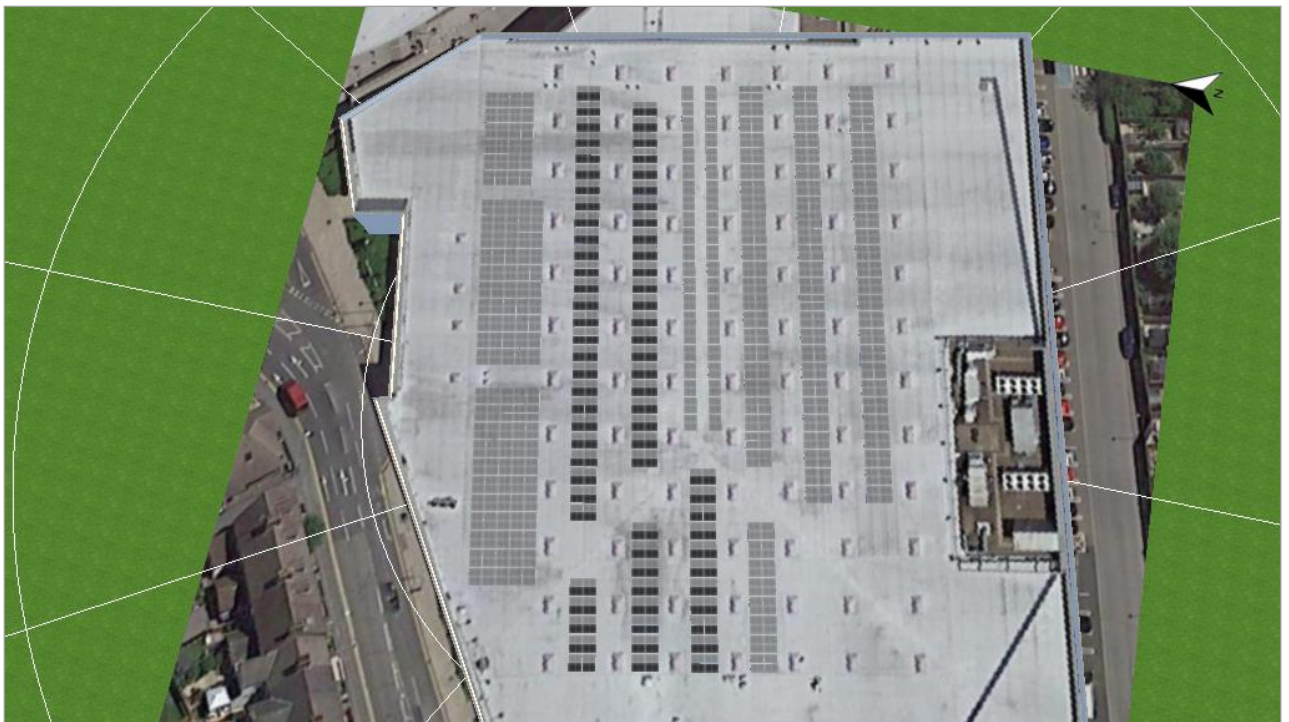


Figure: 4. Module Area - Arbitrary Building 01-Module Area West

Degradation of Module, 4. Module Area - Arbitrary Building 01-Module Area West

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

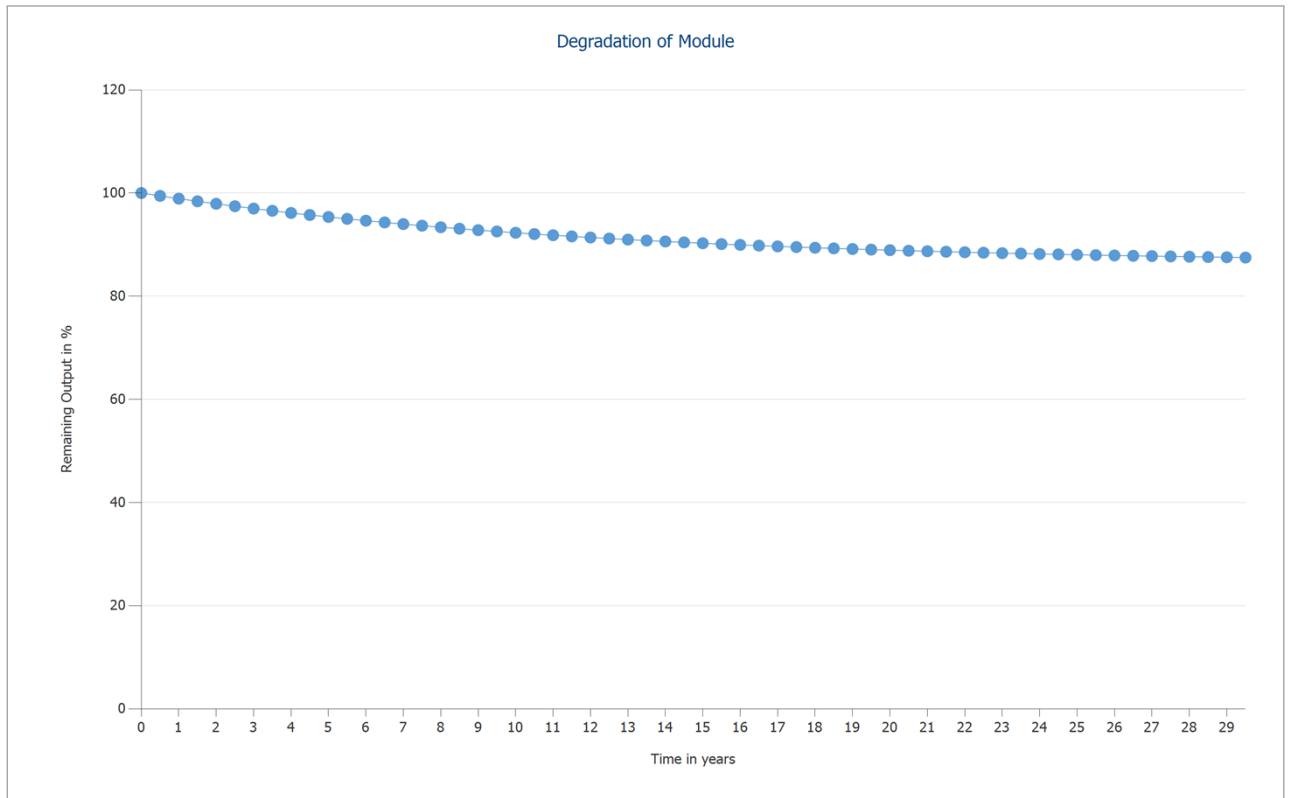


Figure: Degradation of Module, 4. Module Area - Arbitrary Building 01-Module Area West

5. Module Area - Arbitrary Building 01-Module Area East

PV Generator, 5. Module Area - Arbitrary Building 01-Module Area East

Name	Arbitrary Building 01-Module Area East
PV Modules	104 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	East 78 °
Installation Type	Mounted - Roof
PV Generator Surface	207.8 m ²

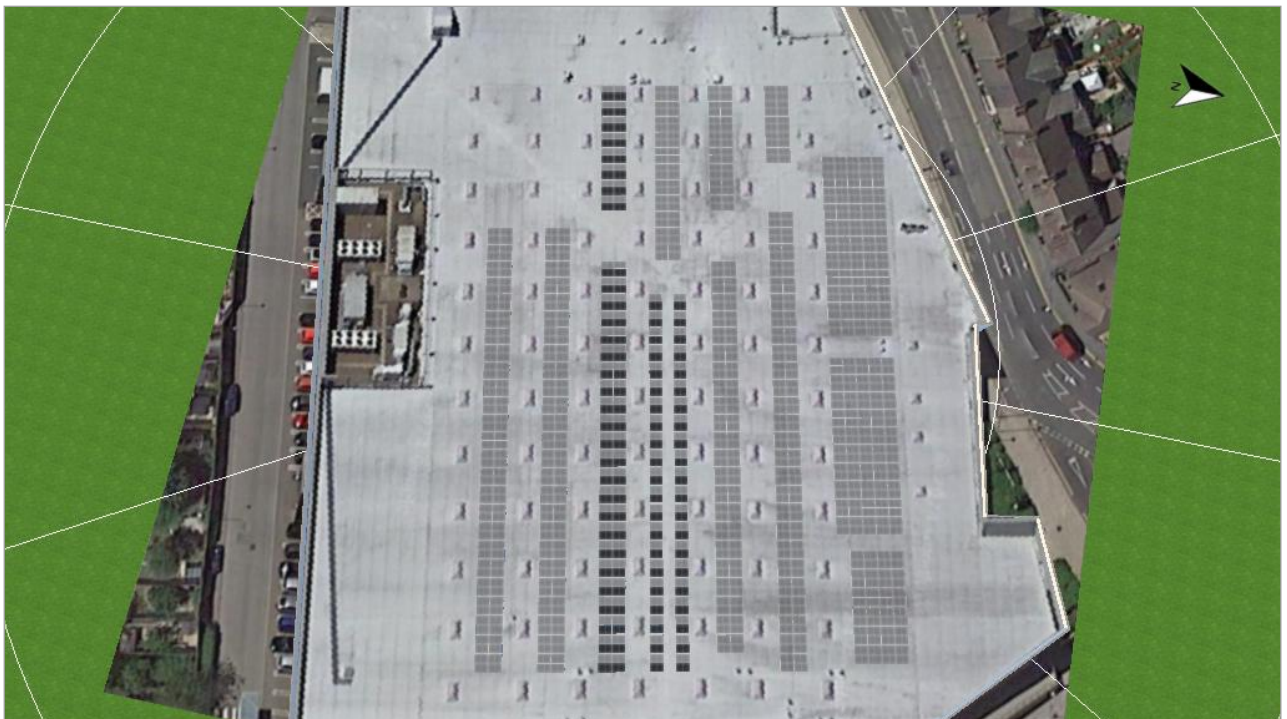


Figure: 5. Module Area - Arbitrary Building 01-Module Area East

Degradation of Module, 5. Module Area - Arbitrary Building 01-Module Area East

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

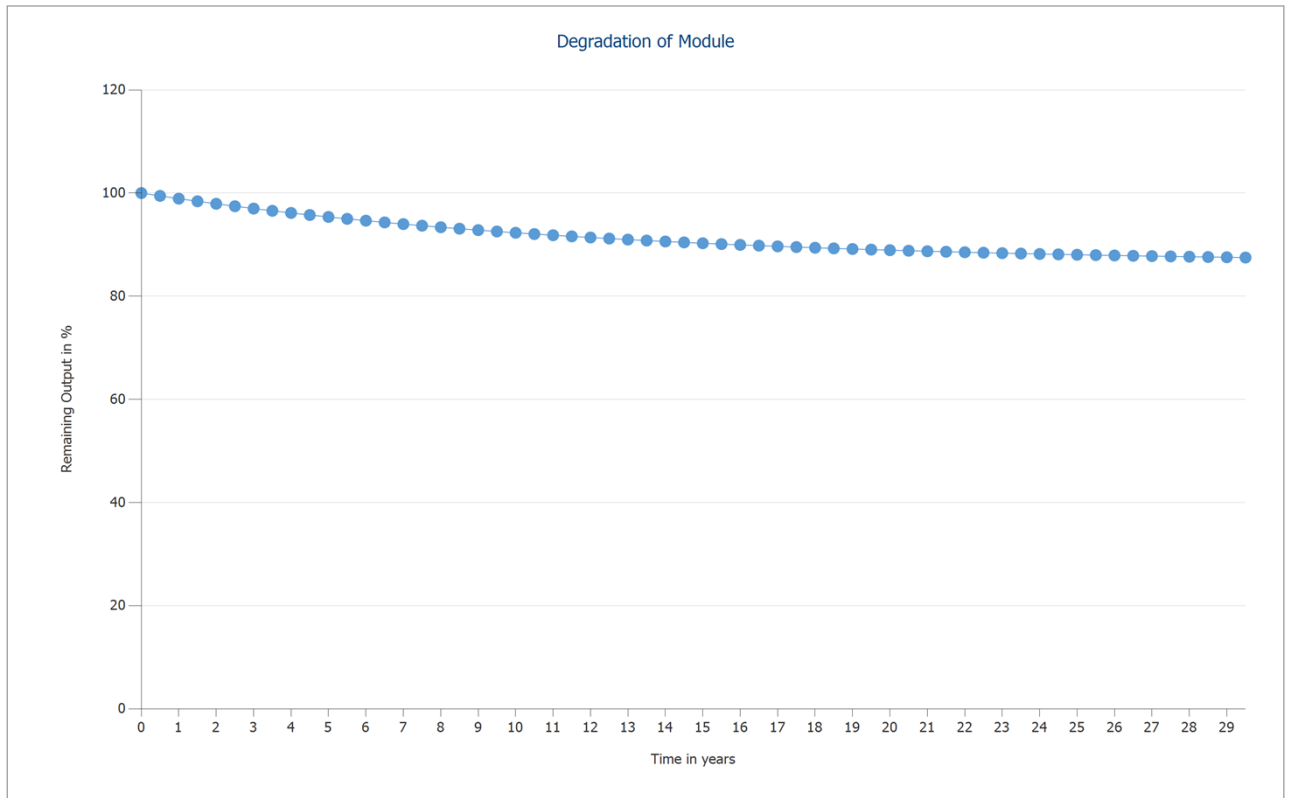


Figure: Degradation of Module, 5. Module Area - Arbitrary Building 01-Module Area East

6. Module Area - Arbitrary Building 01-Module Area West

PV Generator, 6. Module Area - Arbitrary Building 01-Module Area West

Name	Arbitrary Building 01-Module Area West
PV Modules	104 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	West 258 °
Installation Type	Mounted - Roof
PV Generator Surface	207.8 m ²



Figure: 6. Module Area - Arbitrary Building 01-Module Area West

Degradation of Module, 6. Module Area - Arbitrary Building 01-Module Area West

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

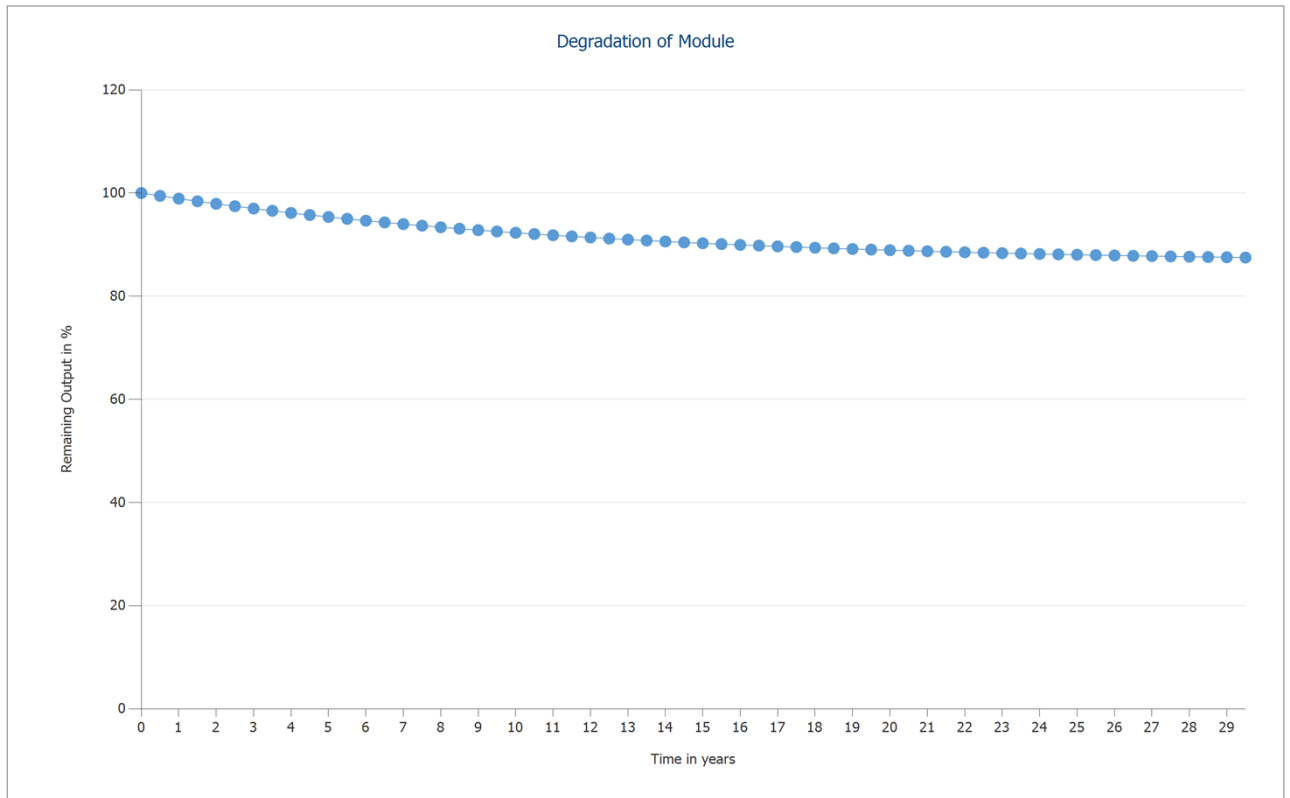


Figure: Degradation of Module, 6. Module Area - Arbitrary Building 01-Module Area West

7. Module Area - Arbitrary Building 01-Module Area East

PV Generator, 7. Module Area - Arbitrary Building 01-Module Area East

Name	Arbitrary Building 01-Module Area East
PV Modules	100 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	East 78 °
Installation Type	Mounted - Roof
PV Generator Surface	199.8 m ²

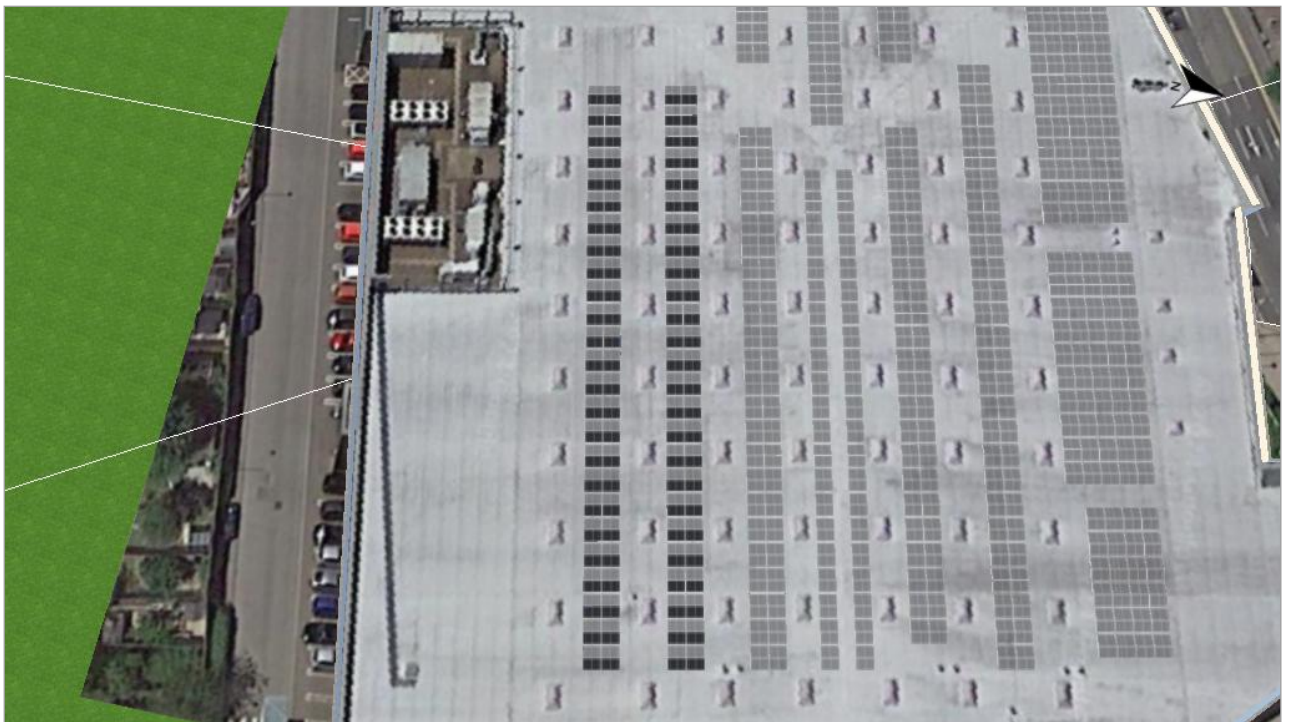


Figure: 7. Module Area - Arbitrary Building 01-Module Area East

Degradation of Module, 7. Module Area - Arbitrary Building 01-Module Area East

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

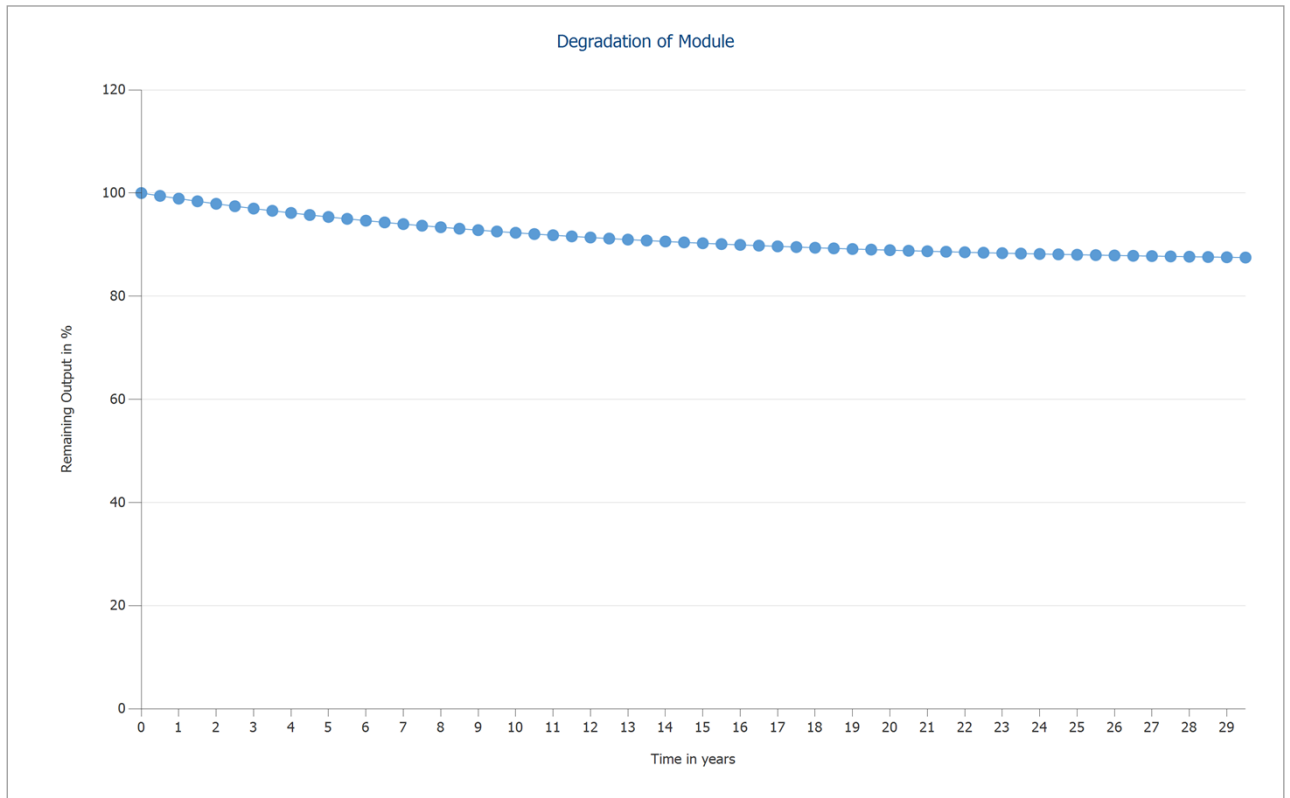


Figure: Degradation of Module, 7. Module Area - Arbitrary Building 01-Module Area East

8. Module Area - Arbitrary Building 01-Module Area West

PV Generator, 8. Module Area - Arbitrary Building 01-Module Area West

Name	Arbitrary Building 01-Module Area West
PV Modules	100 x TSM-425-DE09R.08 VERTEX S (v1)
Manufacturer	Trina Solar
Inclination	10 °
Orientation	West 258 °
Installation Type	Mounted - Roof
PV Generator Surface	199.8 m ²



Figure: 8. Module Area - Arbitrary Building 01-Module Area West

Degradation of Module, 8. Module Area - Arbitrary Building 01-Module Area West

Characteristic curve	Exponential
Remaining power (power output) after 1 year	99 %
Remaining power (power output) after 30 years	87.4 %

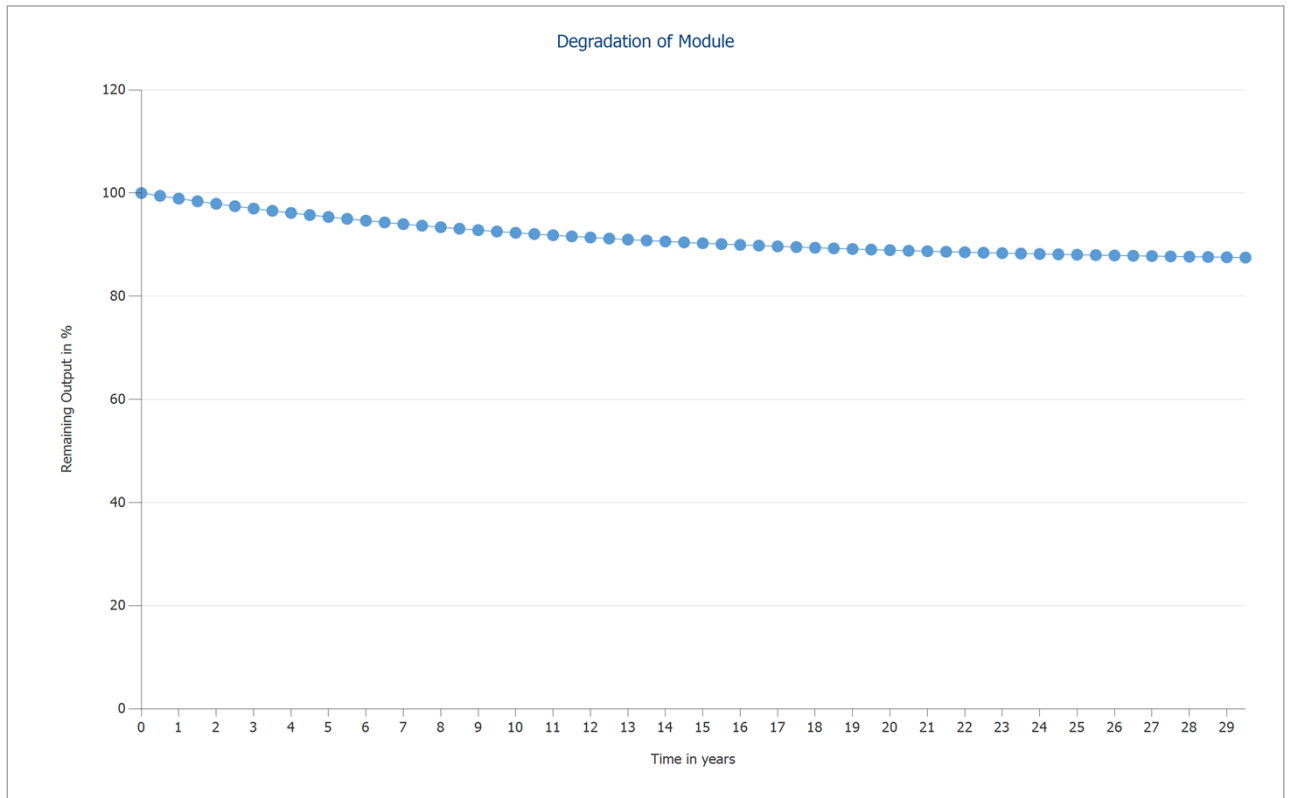


Figure: Degradation of Module, 8. Module Area - Arbitrary Building 01-Module Area West

Horizon Line, 3D Design

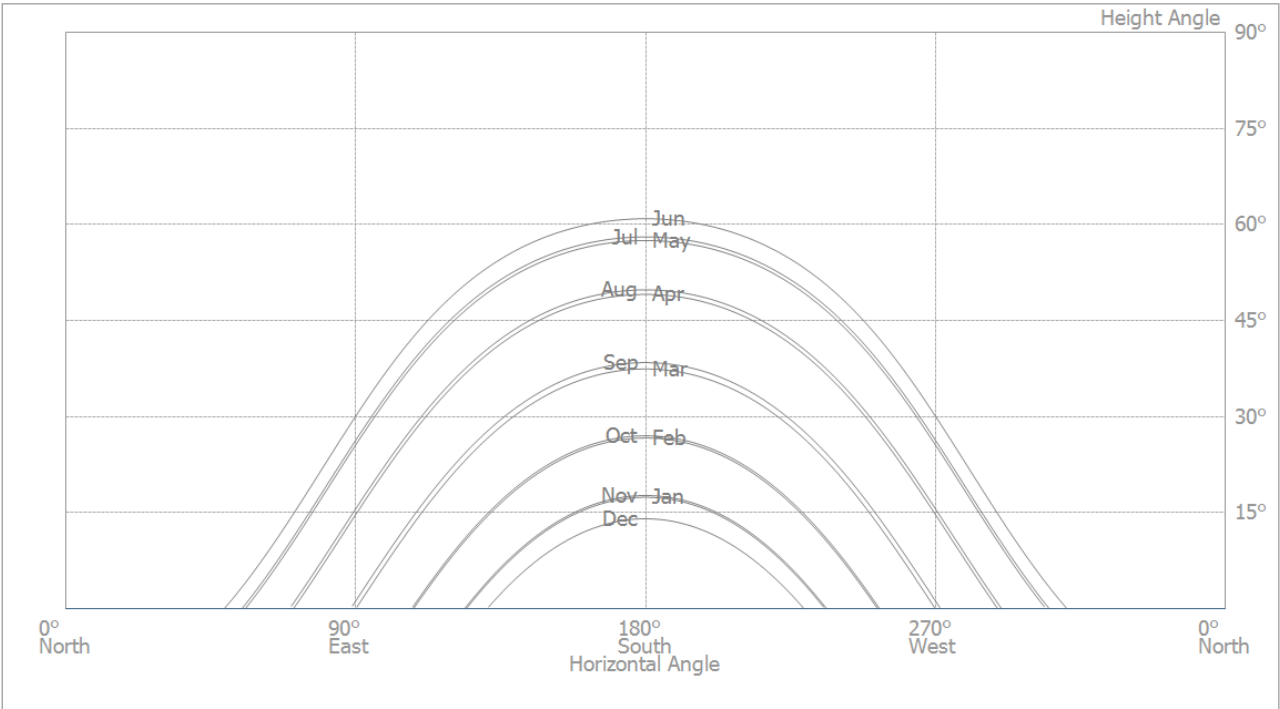


Figure: Horizon (3D Design)

Inverter configuration

Configuration 1

Module Areas		Arbitrary Building 01-Module Area East + Arbitrary Building 01-Module Area West
Inverter 1		
Model	Solis-100K-5G-PRO (v1)	
Manufacturer	Ginlong (Solis)	
Quantity	1	
Sizing Factor	109.6 %	
Configuration	MPP 1: 2 x 19	
	MPP 2: 2 x 18	
	MPP 3: 2 x 18	
	MPP 4: 1 x 19	
	MPP 5: 2 x 19	
	MPP 6: 2 x 18	
	MPP 7: 2 x 18	
	MPP 8: 1 x 19	

Configuration 2

Module Areas	Arbitrary Building 01-Module Area East + Arbitrary Building 01-Module Area West
Inverter 1	
Model	Solis-100K-5G-PRO (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	122.4 %
Configuration	MPP 1: 2 x 18
	MPP 2: 2 x 18
	MPP 3: 2 x 18
	MPP 4: 2 x 18
	MPP 5: 2 x 18
	MPP 6: 2 x 18
	MPP 7: 2 x 18
	MPP 8: 2 x 18

Configuration 3

Module Areas	Arbitrary Building 01-Module Area East + Arbitrary Building 01-Module Area West
Inverter 1	
Model	Solis-80K-5G-PRO (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	110.5 %
Configuration	MPP 1: 2 x 18
	MPP 2: 2 x 17
	MPP 3: 2 x 17
	MPP 4: 2 x 18
	MPP 5: 2 x 17
	MPP 6: 2 x 17

Configuration 4

Module Areas	Arbitrary Building 01-Module Area East + Arbitrary Building 01-Module Area West
Inverter 1	
Model	Solis-80K-5G-PRO (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	106.3 %
Configuration	MPP 1: 2 x 17
	MPP 2: 2 x 17
	MPP 3: 2 x 16
	MPP 4: 2 x 17
	MPP 5: 2 x 17
	MPP 6: 2 x 16

AC Mains

AC Mains

Number of Phases	3
Mains voltage between phase and neutral	400 V
Displacement Power Factor (cos phi)	+/- 1

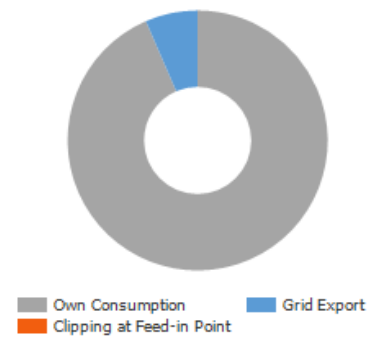
Simulation Results

Results Total System

PV System

PV Generator Output	405.45 kWp
Spec. Annual Yield	889.78 kWh/kWp
Performance Ratio (PR)	91.67 %
Yield Reduction due to Shading	1.1 %
PV Generator Energy (AC grid)	360,793 kWh/Year
Own Consumption	337,255 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	23,537 kWh/Year
Own Power Consumption	93.5 %
CO ₂ Emissions avoided	81,172 kg / year

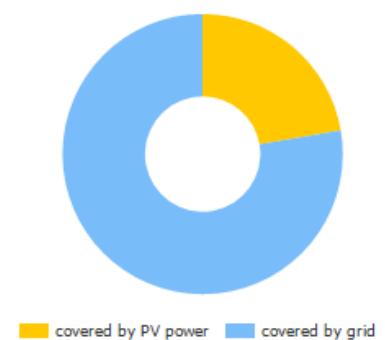
PV Generator Energy (AC grid)



Appliances

Appliances	1,513,370 kWh/Year
Standby Consumption (Inverter)	30 kWh/Year
Total Consumption	1,513,400 kWh/Year
covered by PV power	337,255 kWh/Year
covered by grid	1,176,145 kWh/Year
Solar Fraction	22.3 %

Total Consumption

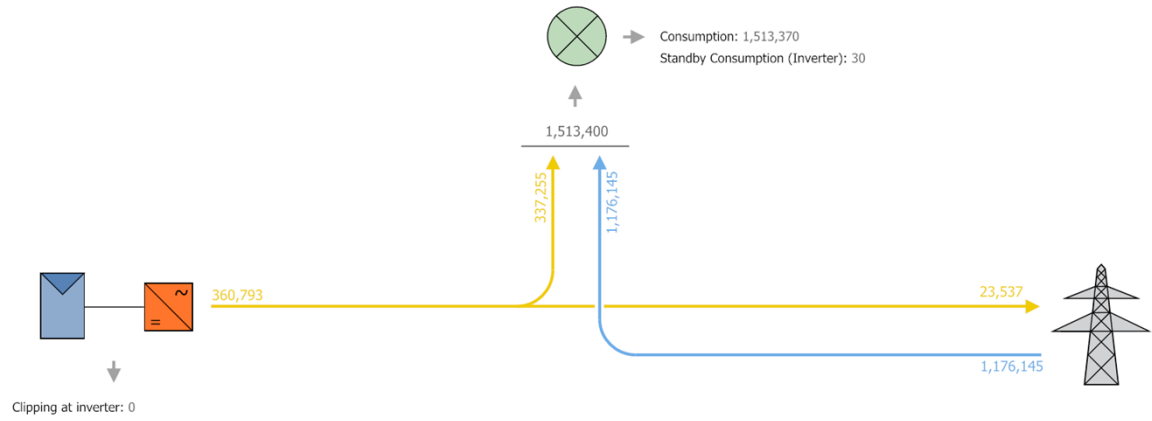


Level of Self-sufficiency

Total Consumption	1,513,400 kWh/Year
covered by grid	1,176,145 kWh/Year
Level of Self-sufficiency	22.3 %

Energy Flow Graph

Project: Sainsbury's - Hinckley



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

Figure: Energy flow

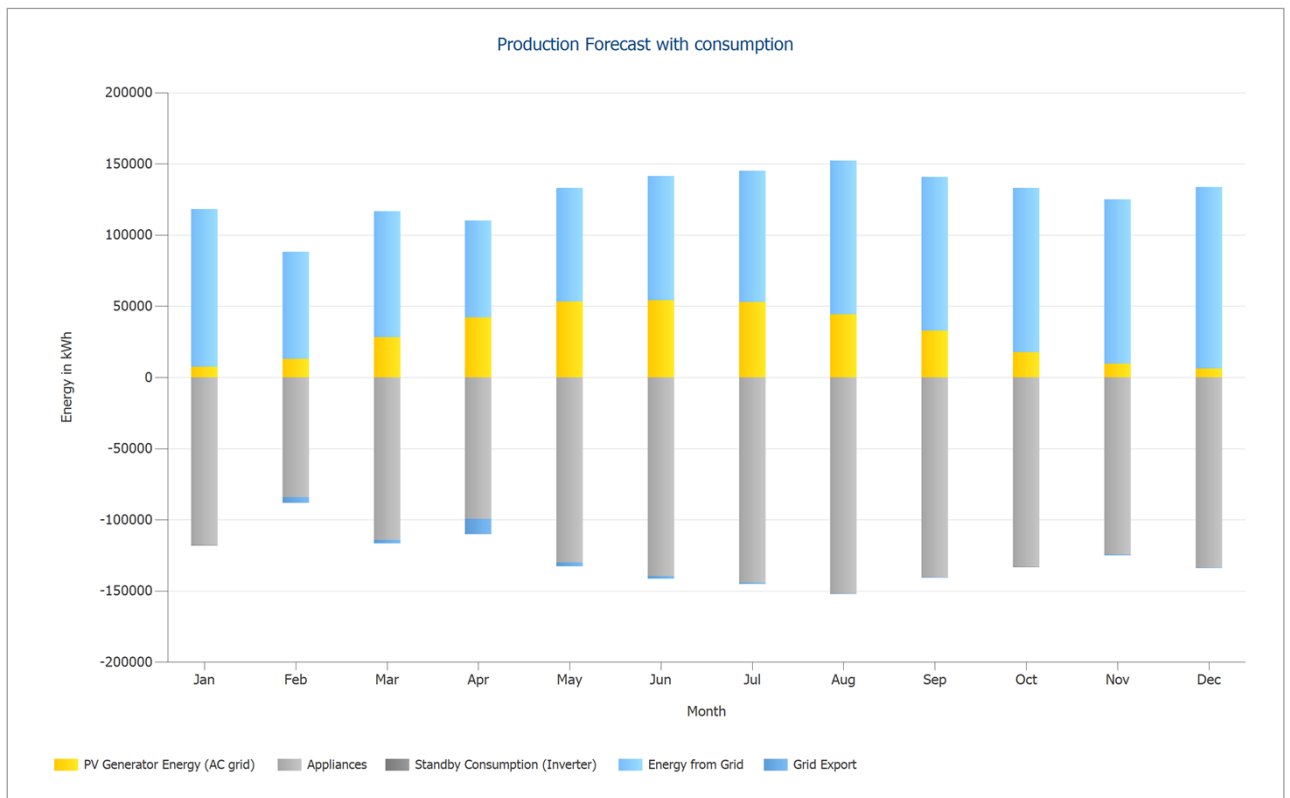


Figure: Production Forecast with consumption

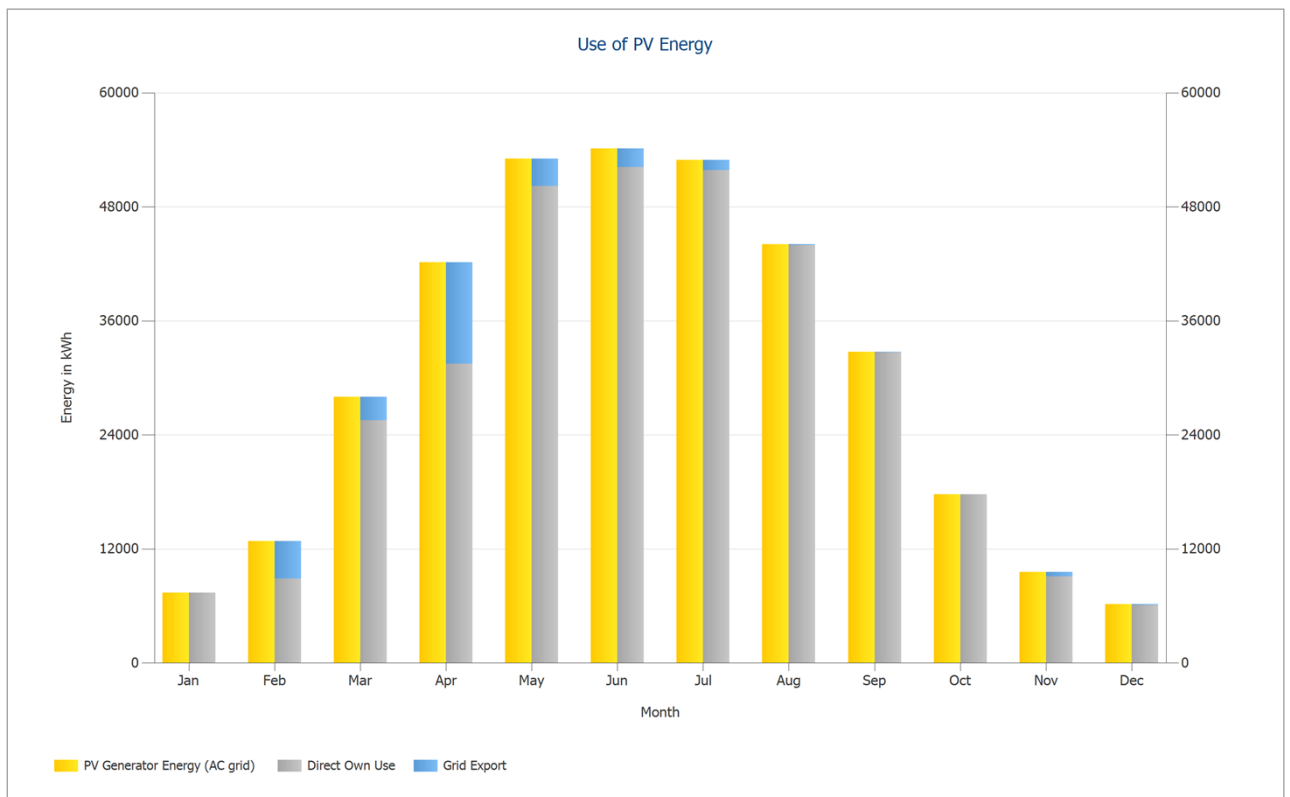


Figure: Use of PV Energy

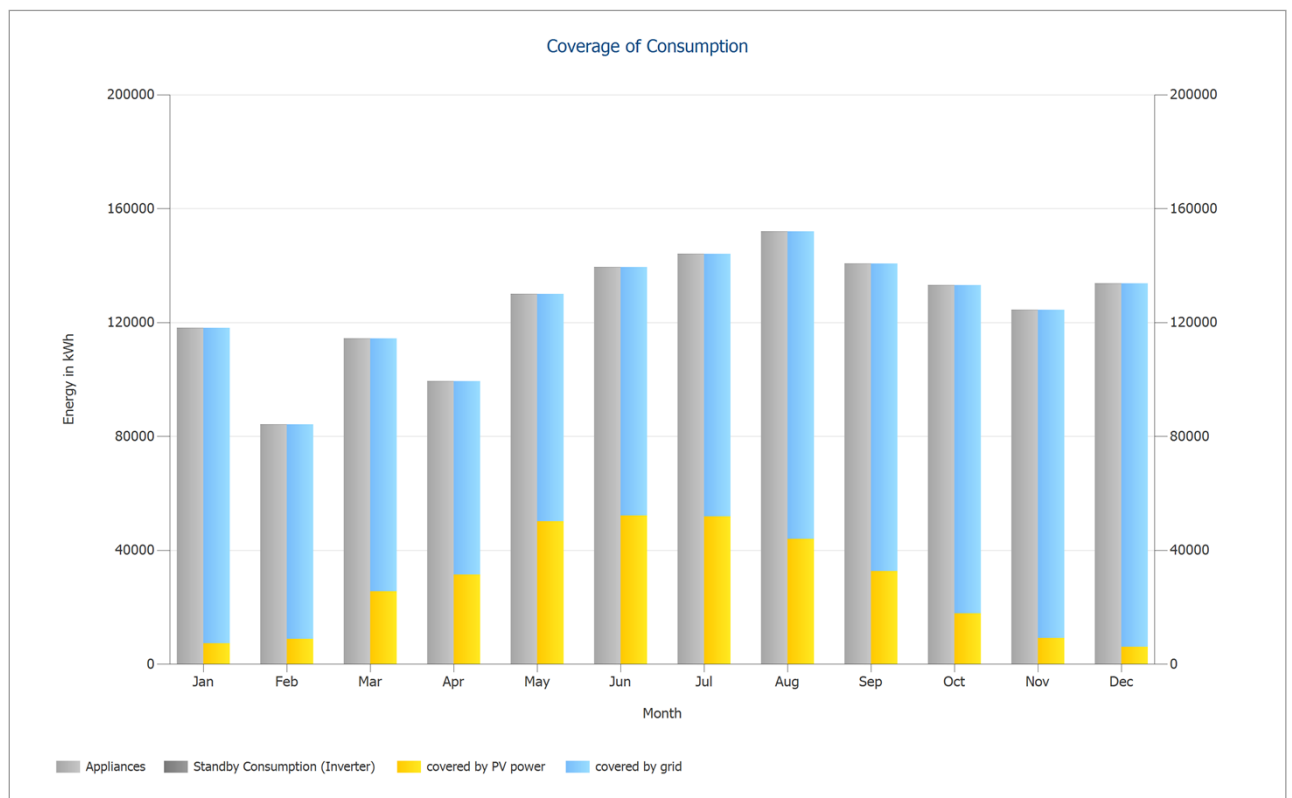


Figure: Coverage of Consumption

Results per Module Area

Arbitrary Building 01-Module Area East

PV Generator Output	54.82 kWp
PV Generator Surface	257.76 m ²
Global Radiation at the Module	947.11 kWh/m ²
Global Radiation on Module without reflection	949.70 kWh/m ²
Performance Ratio (PR)	91.74 %
PV Generator Energy (AC grid)	47807.72 kWh/Year
Spec. Annual Yield	872.01 kWh/kWp

Arbitrary Building 01-Module Area West

PV Generator Output	54.82 kWp
PV Generator Surface	257.76 m ²
Global Radiation at the Module	984.27 kWh/m ²
Global Radiation on Module without reflection	986.83 kWh/m ²
Performance Ratio (PR)	91.51 %
PV Generator Energy (AC grid)	49549.87 kWh/Year
Spec. Annual Yield	903.78 kWh/kWp

Arbitrary Building 01-Module Area East

PV Generator Output	61.20 kWp
PV Generator Surface	287.73 m ²
Global Radiation at the Module	952.92 kWh/m ²
Global Radiation on Module without reflection	955.52 kWh/m ²
Performance Ratio (PR)	91.46 %
PV Generator Energy (AC grid)	53528.57 kWh/Year
Spec. Annual Yield	874.65 kWh/kWp

Arbitrary Building 01-Module Area West

PV Generator Output	61.20 kWp
PV Generator Surface	287.73 m ²
Global Radiation at the Module	984.27 kWh/m ²
Global Radiation on Module without reflection	986.83 kWh/m ²
Performance Ratio (PR)	91.85 %
PV Generator Energy (AC grid)	55516.54 kWh/Year
Spec. Annual Yield	907.13 kWh/kWp

Arbitrary Building 01-Module Area East

PV Generator Output	44.20 kWp
PV Generator Surface	207.80 m ²
Global Radiation at the Module	952.92 kWh/m ²
Global Radiation on Module without reflection	955.52 kWh/m ²
Performance Ratio (PR)	91.39 %
PV Generator Energy (AC grid)	38630.50 kWh/Year
Spec. Annual Yield	873.99 kWh/kWp

Arbitrary Building 01-Module Area West

PV Generator Output	44.20 kWp
PV Generator Surface	207.80 m ²
Global Radiation at the Module	984.27 kWh/m ²
Global Radiation on Module without reflection	986.83 kWh/m ²
Performance Ratio (PR)	91.81 %
PV Generator Energy (AC grid)	40081.27 kWh/Year
Spec. Annual Yield	906.82 kWh/kWp

Arbitrary Building 01-Module Area East

PV Generator Output	42.50 kWp
PV Generator Surface	199.81 m ²
Global Radiation at the Module	947.11 kWh/m ²
Global Radiation on Module without reflection	949.70 kWh/m ²
Performance Ratio (PR)	91.93 %
PV Generator Energy (AC grid)	37136.84 kWh/Year
Spec. Annual Yield	873.81 kWh/kWp

Arbitrary Building 01-Module Area West

PV Generator Output	42.50 kWp
PV Generator Surface	199.81 m ²
Global Radiation at the Module	984.27 kWh/m ²
Global Radiation on Module without reflection	986.83 kWh/m ²
Performance Ratio (PR)	91.82 %
PV Generator Energy (AC grid)	38541.45 kWh/Year
Spec. Annual Yield	906.86 kWh/kWp

Plans and parts list

Circuit Diagram

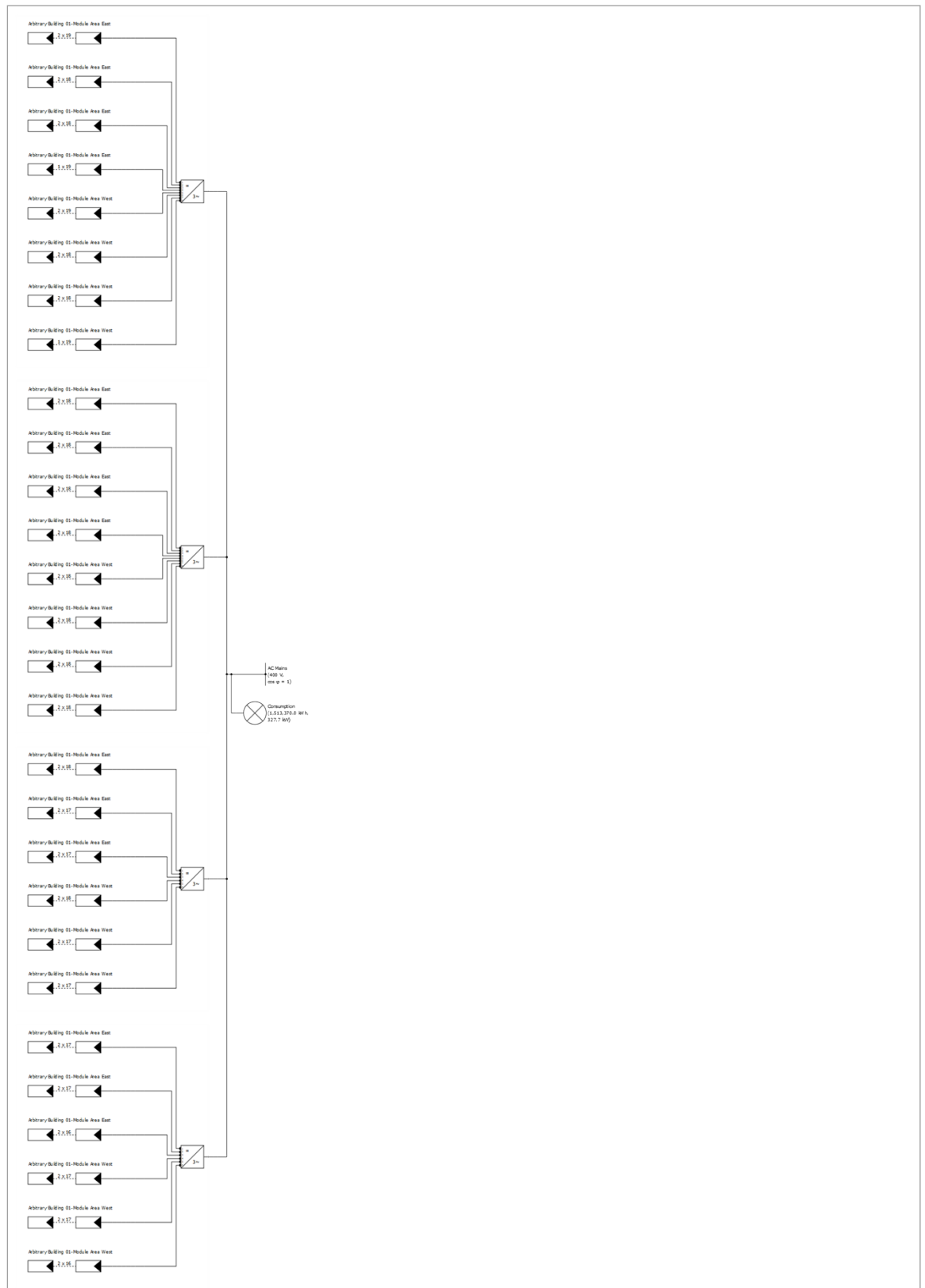


Figure: Circuit Diagram

Overview plan

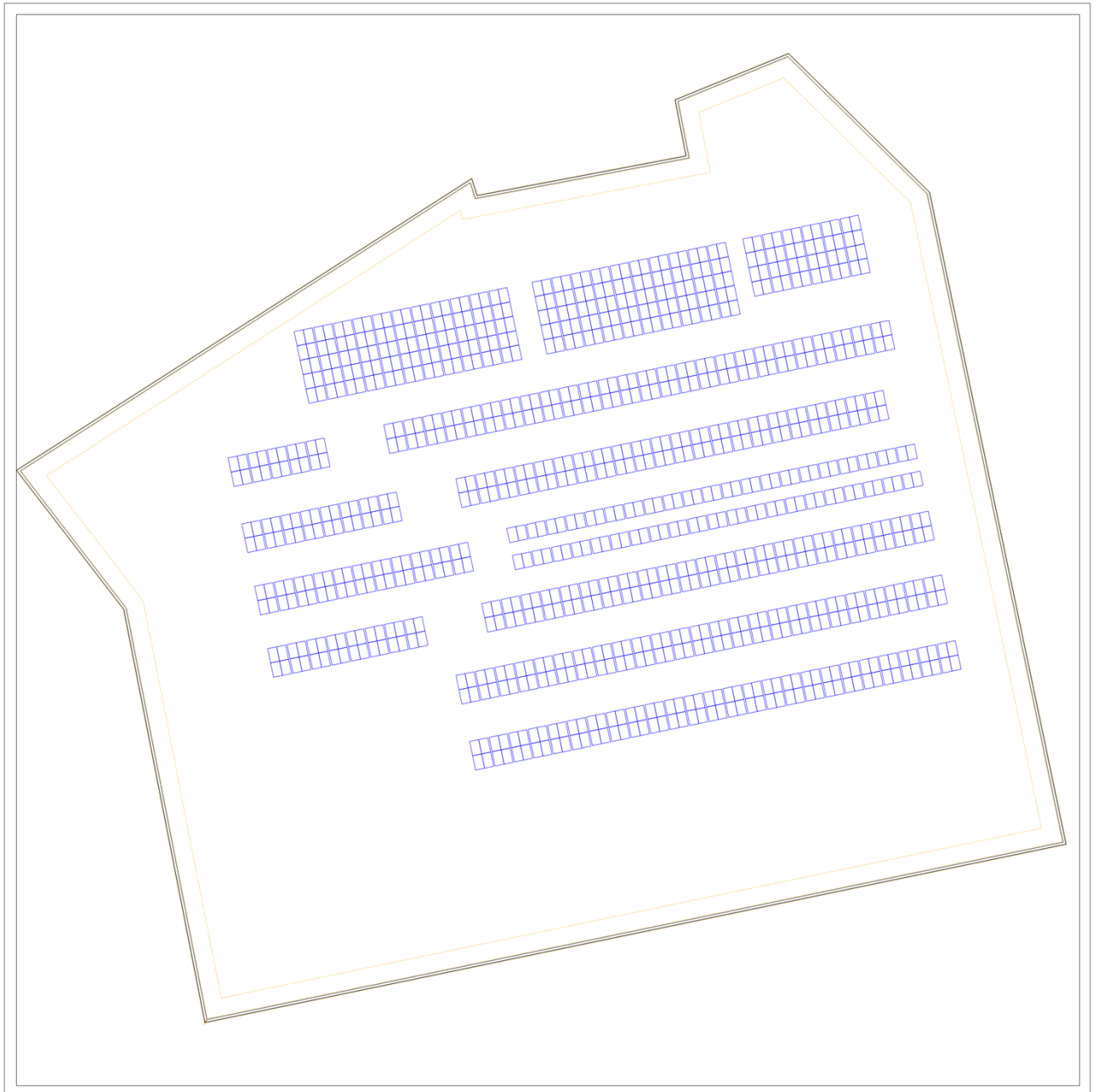


Figure: Overview plan

Dimensioning Plan

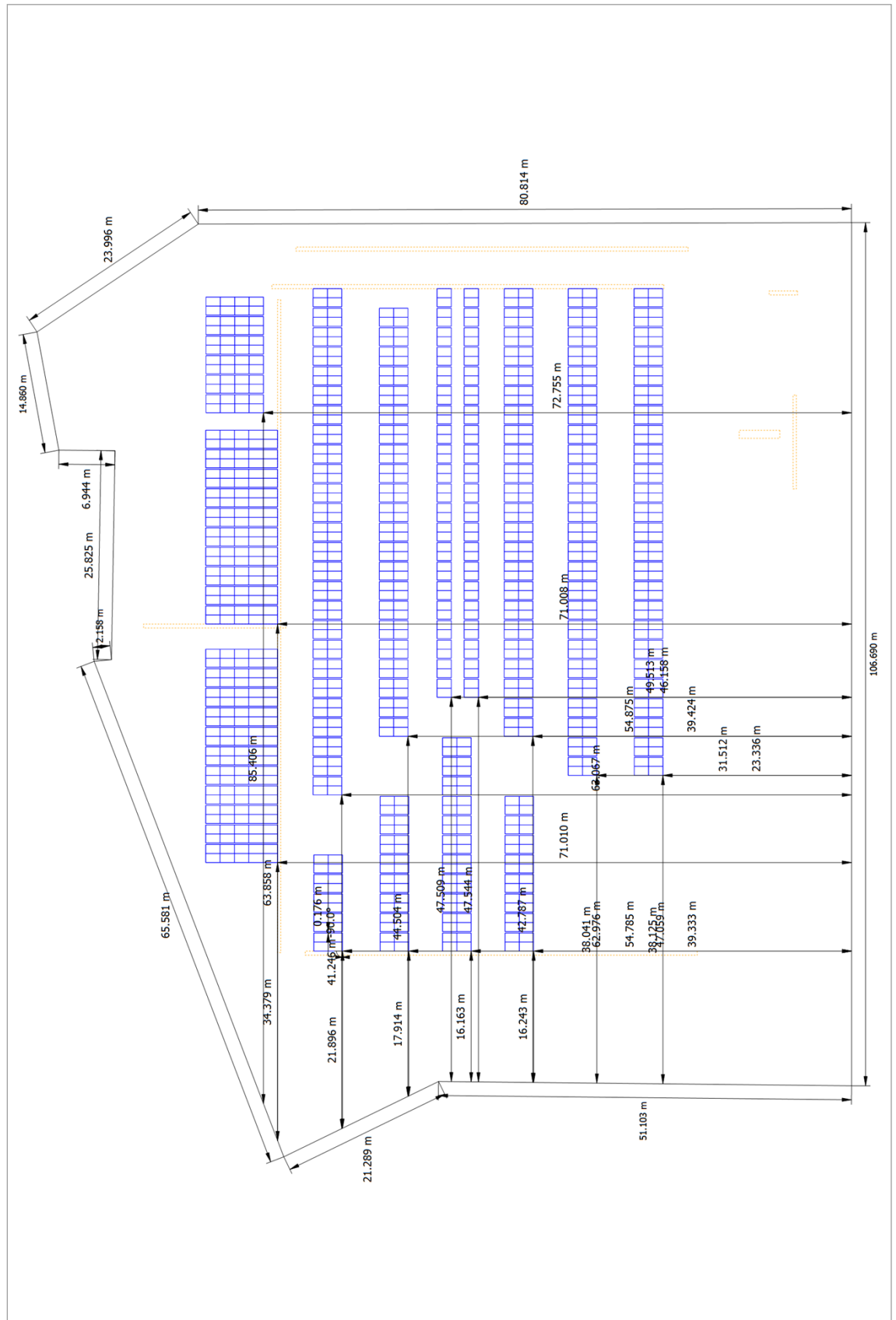


Figure: Arbitrary Building 01 - Mounting Surface South

String Plan

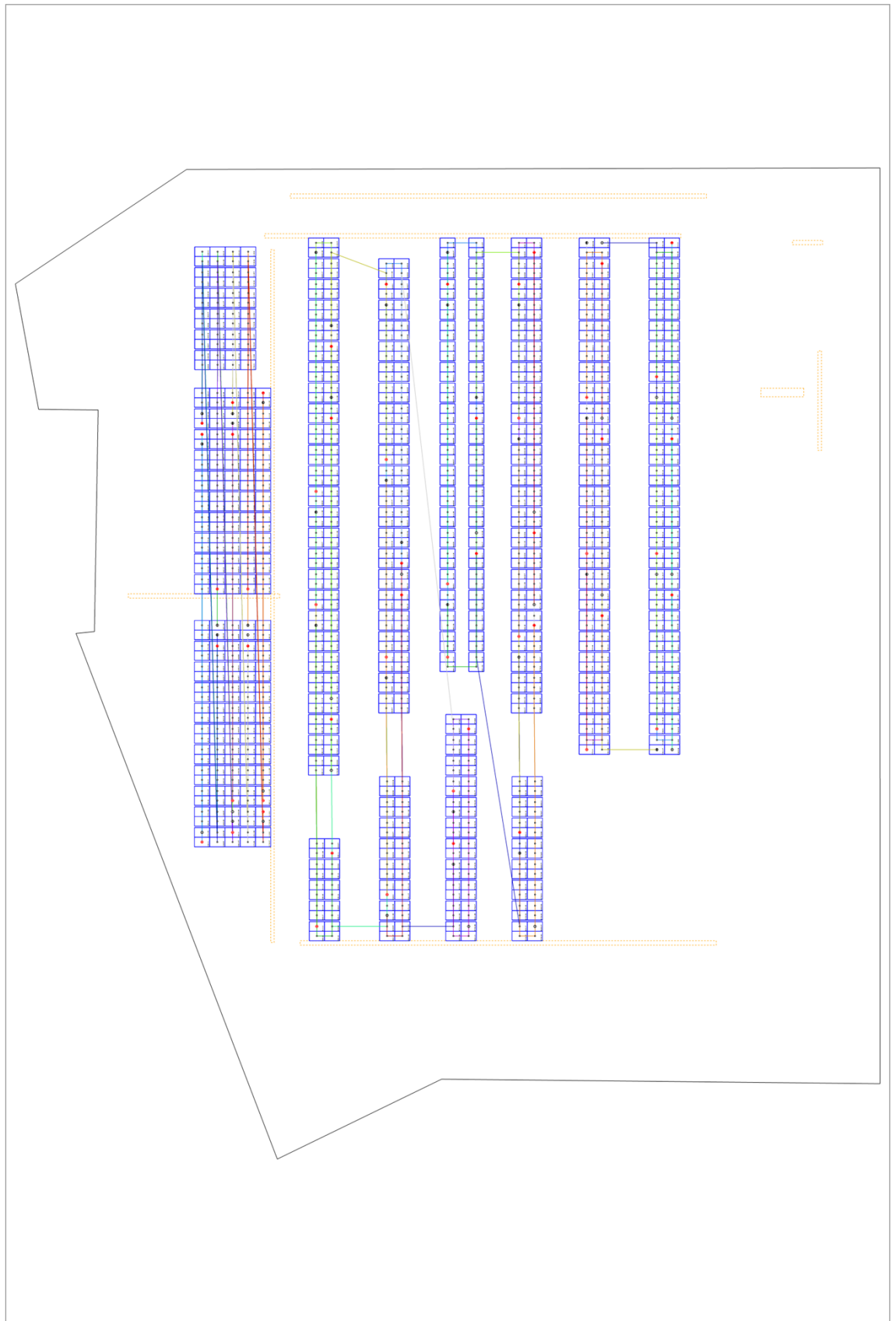


Figure: Arbitrary Building 01 - Mounting Surface South

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		Trina Solar	TSM-425-DE09R.08 VERTEX S	954	Piece
2	Inverter		Ginlong (Solis)	Solis-100K-5G-PRO	2	Piece
3	Inverter		Ginlong (Solis)	Solis-80K-5G-PRO	2	Piece