CorEnergy
Enterprise Point, Altrincham Rd, Sharston
M22 9AF
United Kingdom

Project Name: Sainsbury's - Hayes

17/10/2024

Documentation

Customer Details

Company	Sainsbury's
Customer Number	
Contact person	
Address	
Phone	
Fax	
E-Mail	

Project Data

Project Name	Sainsbury's - Hayes
Offer no.	
Project Designer	James Burke
Address	Sainsbury's, Lombardy Retail Park, Coldharbour Ln, Hayes UB3 3EX

Project Description:
Rooftop PV

Project Designer: James Burke **Client:** Sainsbury's

Project Overview

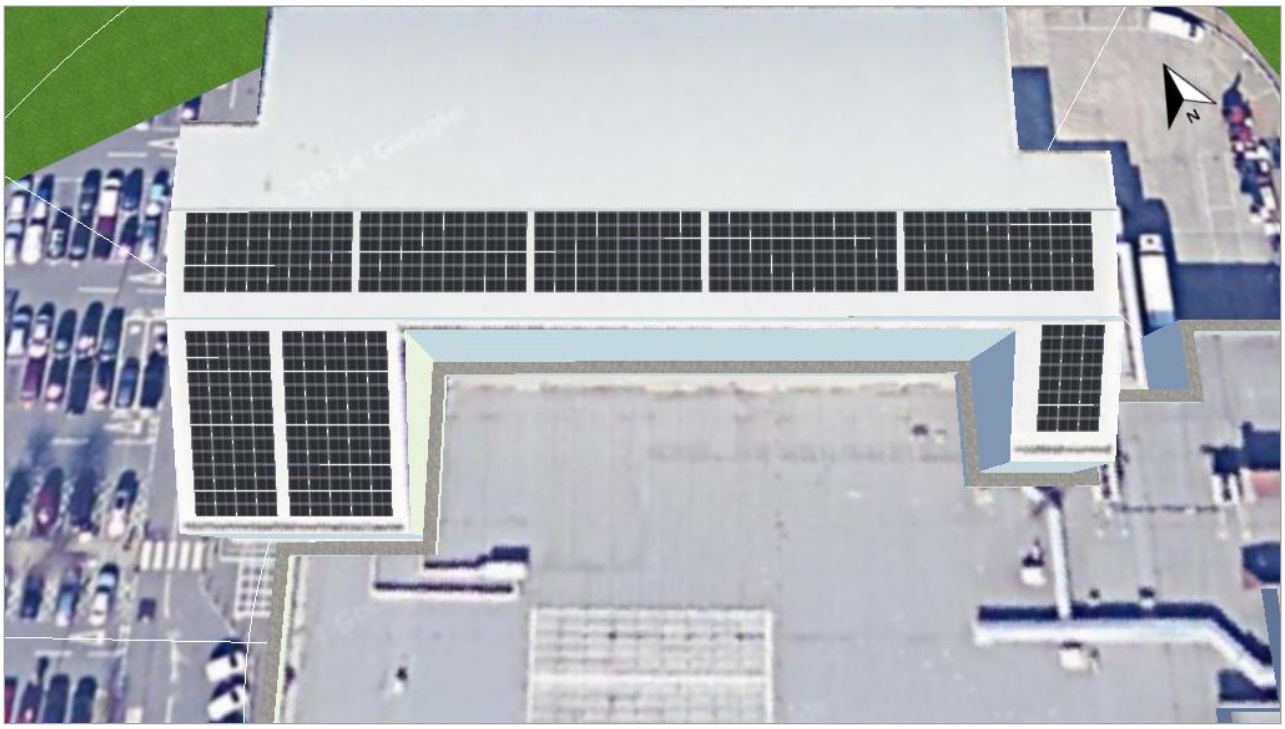


Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System with Electrical Appliances

Climate Data	Hayes, GBR (2001 - 2020)	
Values source	Meteonorm 8.2(i)	
PV Generator Output	170.85	kWp
PV Generator Surface	803.2	m²
Number of PV Modules	402	
Number of Inverters	2	

Sainsbury's - Hayes

Project Designer: James Burke **Client:** Sainsbury's

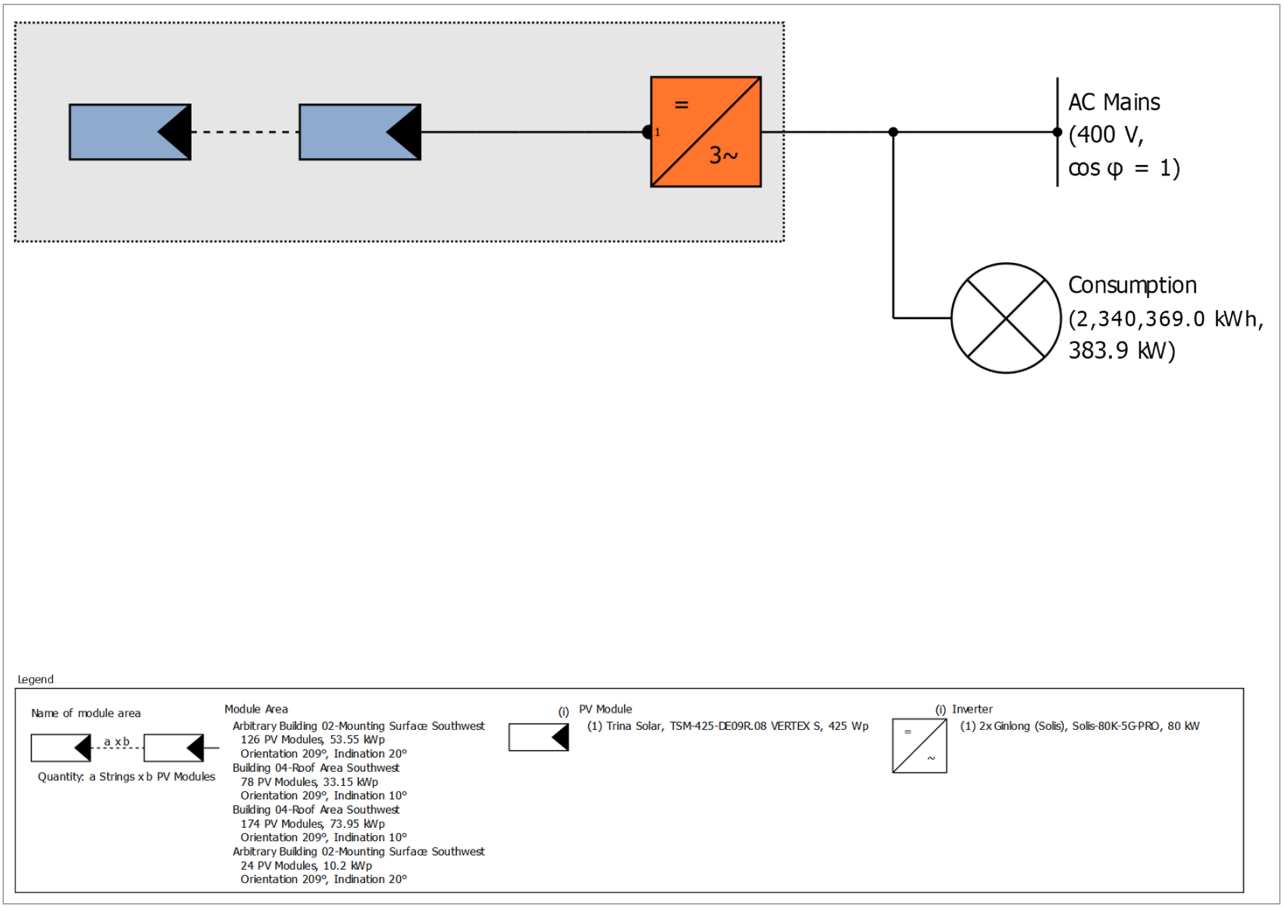


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	170.85	kWp
Spec. Annual Yield	994.27	kWh/kWp
Performance Ratio (PR)	90.59	%
Yield Reduction due to Shading	1.2	%
PV Generator Energy (AC grid)	169,888	kWh/Year
Own Consumption	161,332	kWh/Year
Clipping at Feed-in Point	0	kWh/Year
Grid Export	8,555	kWh/Year
Own Power Consumption	95.0	%
CO_2 Emissions avoided	38,221	kg / year
Level of Self-sufficiency	6.9	%

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.

Project Designer: James Burke **Client:** Sainsbury's

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	Hayes, 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	2340369 kWh
Hayes	2340369 kWh
Load Peak	383.9 kW

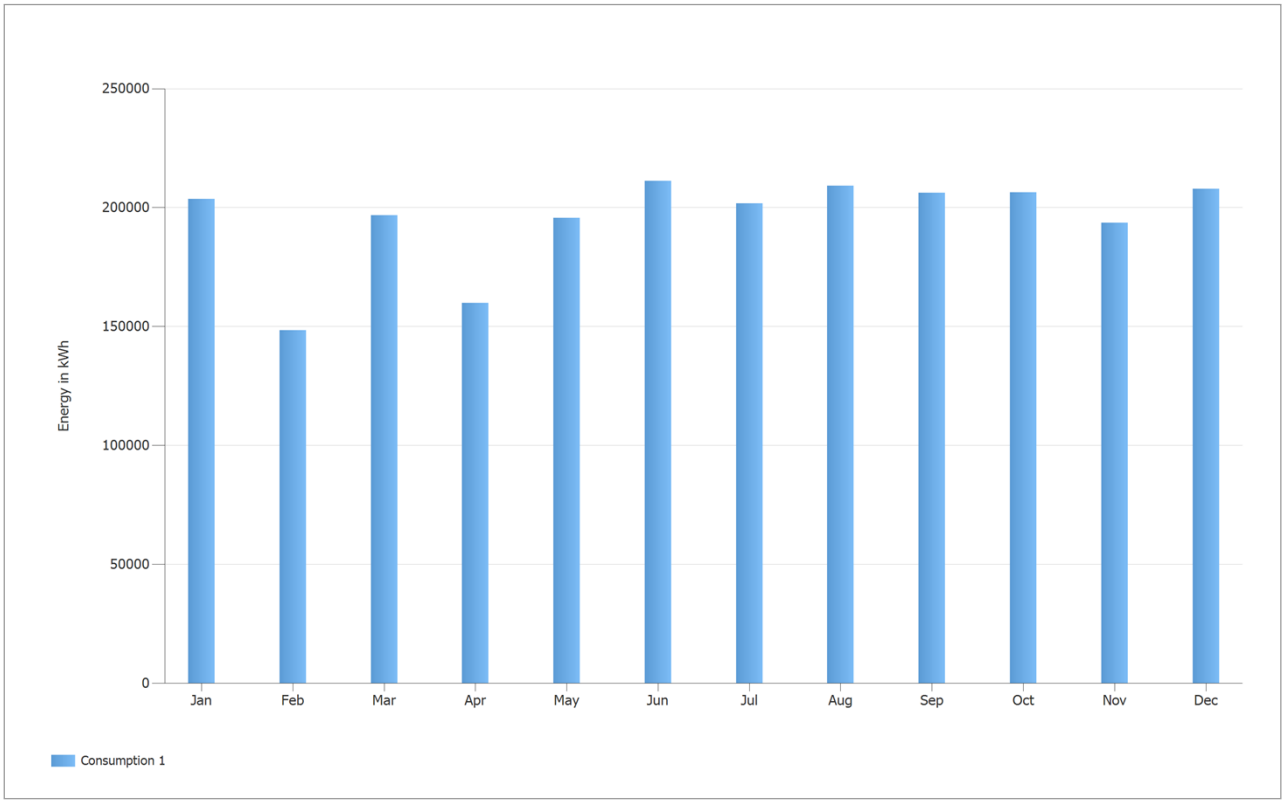


Figure: Consumption

Module Areas

1. Module Area - Arbitrary Building 02-Mounting Surface Southwest

PV Generator, 1. Module Area - Arbitrary Building 02-Mounting Surface Southwest

Name	Arbitrary Building 02-Mounting Surface Southwest	
PV Modules	126 x TSM-425-DE09R.08 VERTEX S (v1)	
Manufacturer	Trina Solar	
Inclination	20	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	251.8	m²

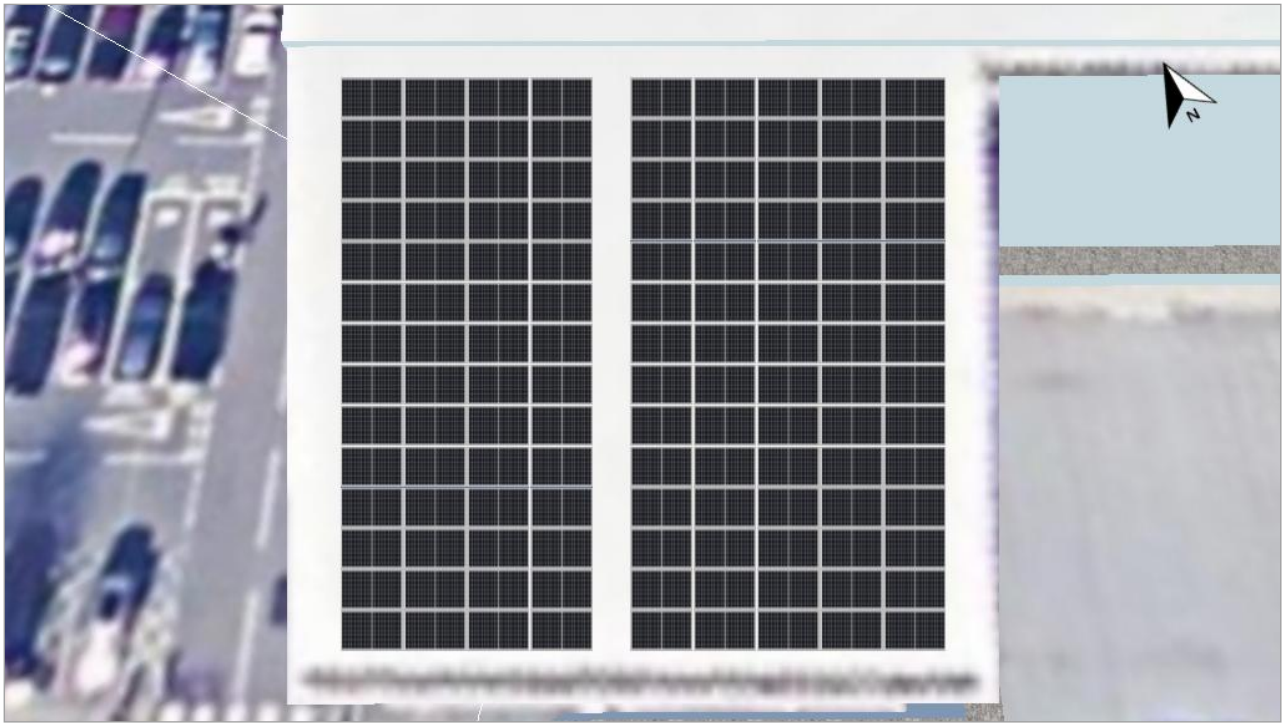


Figure: 1. Module Area - Arbitrary Building 02-Mounting Surface Southwest

Degradation of Module, 1. Module Area - Arbitrary Building 02-Mounting Surface Southwest

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

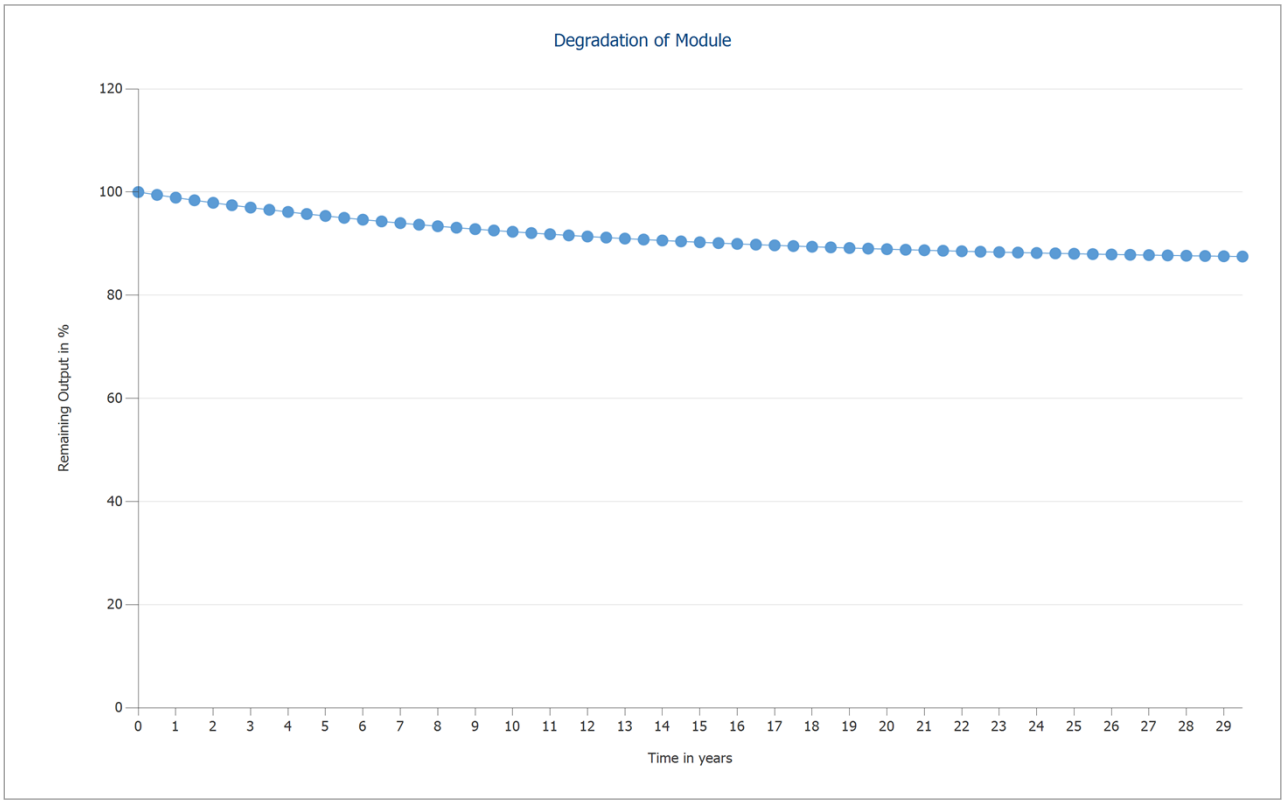


Figure: Degradation of Module, 1. Module Area - Arbitrary Building 02-Mounting Surface Southwest

2. Module Area - Building 04-Roof Area Southwest

PV Generator, 2. Module Area - Building 04-Roof Area Southwest

Name	Building 04-Roof Area Southwest	
PV Modules	78 x TSM-425-DE09R.08 VERTEX S (v1)	
Manufacturer	Trina Solar	
Inclination	10	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	155.9	m²

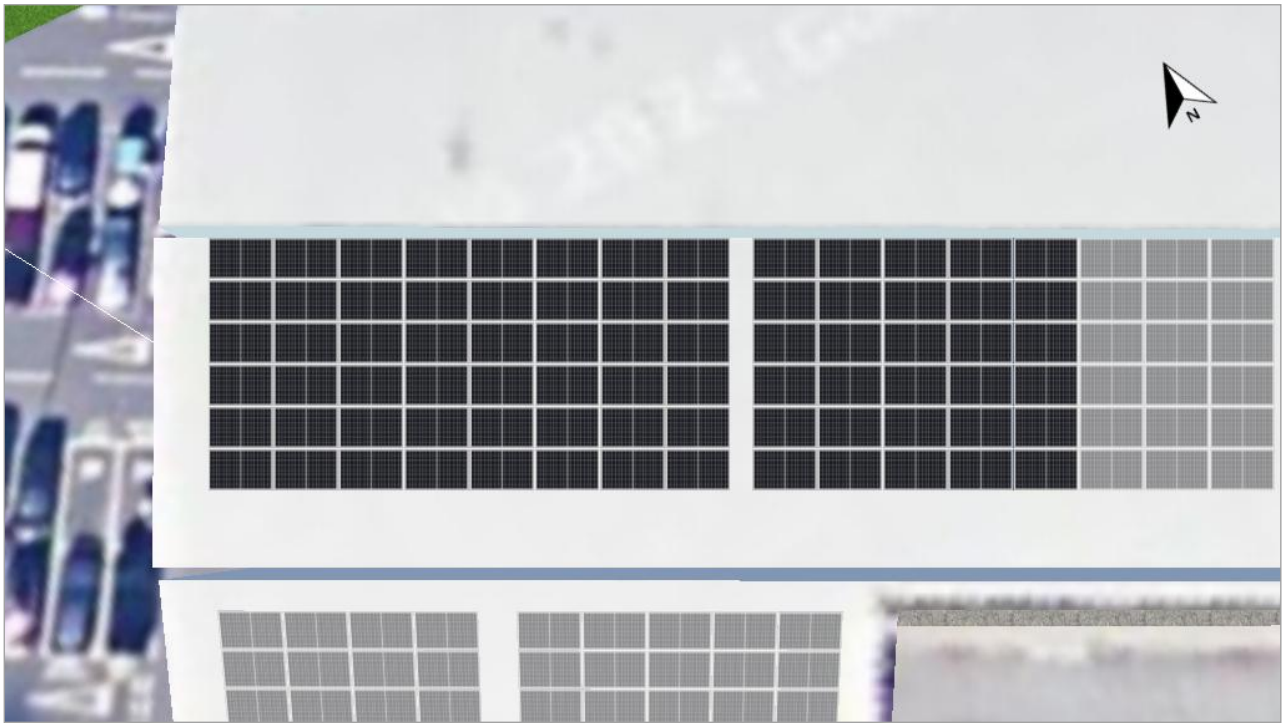


Figure: 2. Module Area - Building 04-Roof Area Southwest

Degradation of Module, 2. Module Area - Building 04-Roof Area Southwest

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

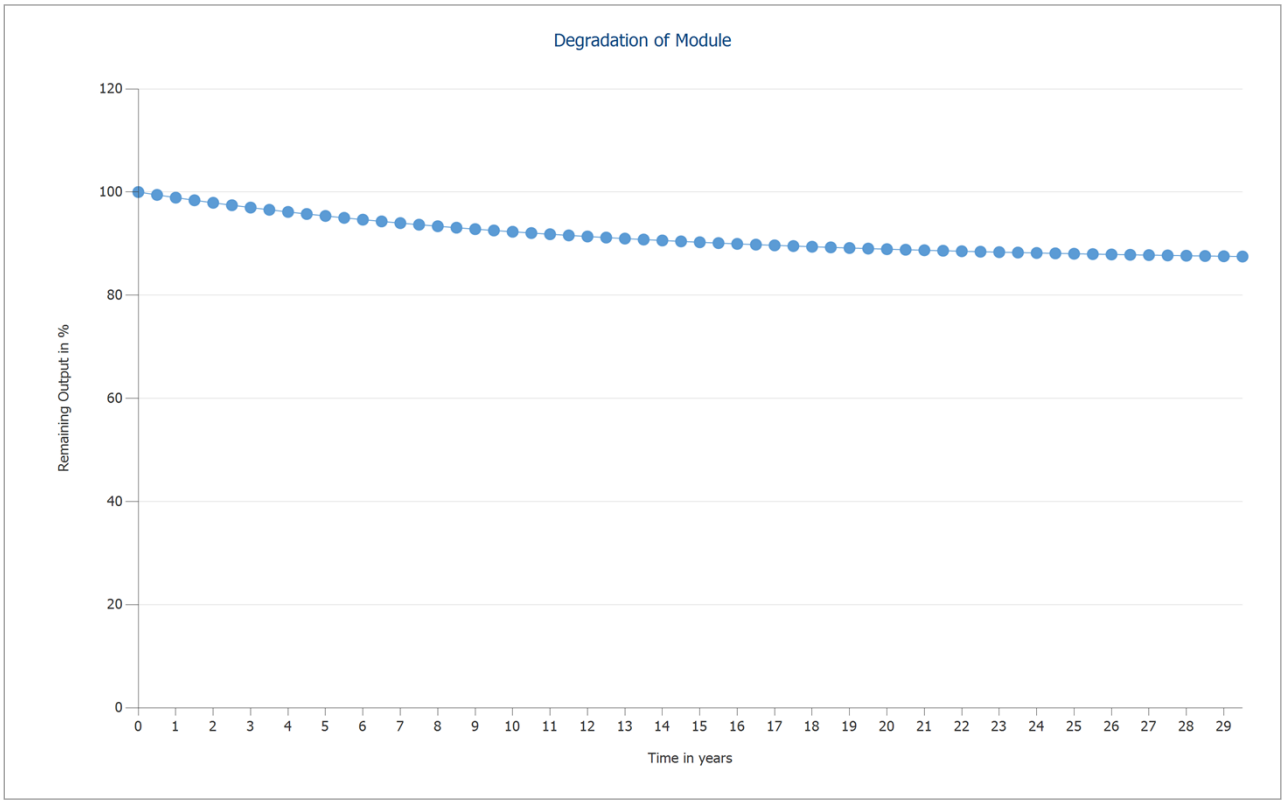


Figure: Degradation of Module, 2. Module Area - Building 04-Roof Area Southwest

3. Module Area - Building 04-Roof Area Southwest

PV Generator, 3. Module Area - Building 04-Roof Area Southwest

Name	Building 04-Roof Area Southwest	
PV Modules	174 x TSM-425-DE09R.08 VERTEX S (v1)	
Manufacturer	Trina Solar	
Inclination	10	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	347.7	m²

Figure: 3. Module Area - Building 04-Roof Area Southwest

Degradation of Module, 3. Module Area - Building 04-Roof Area Southwest

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

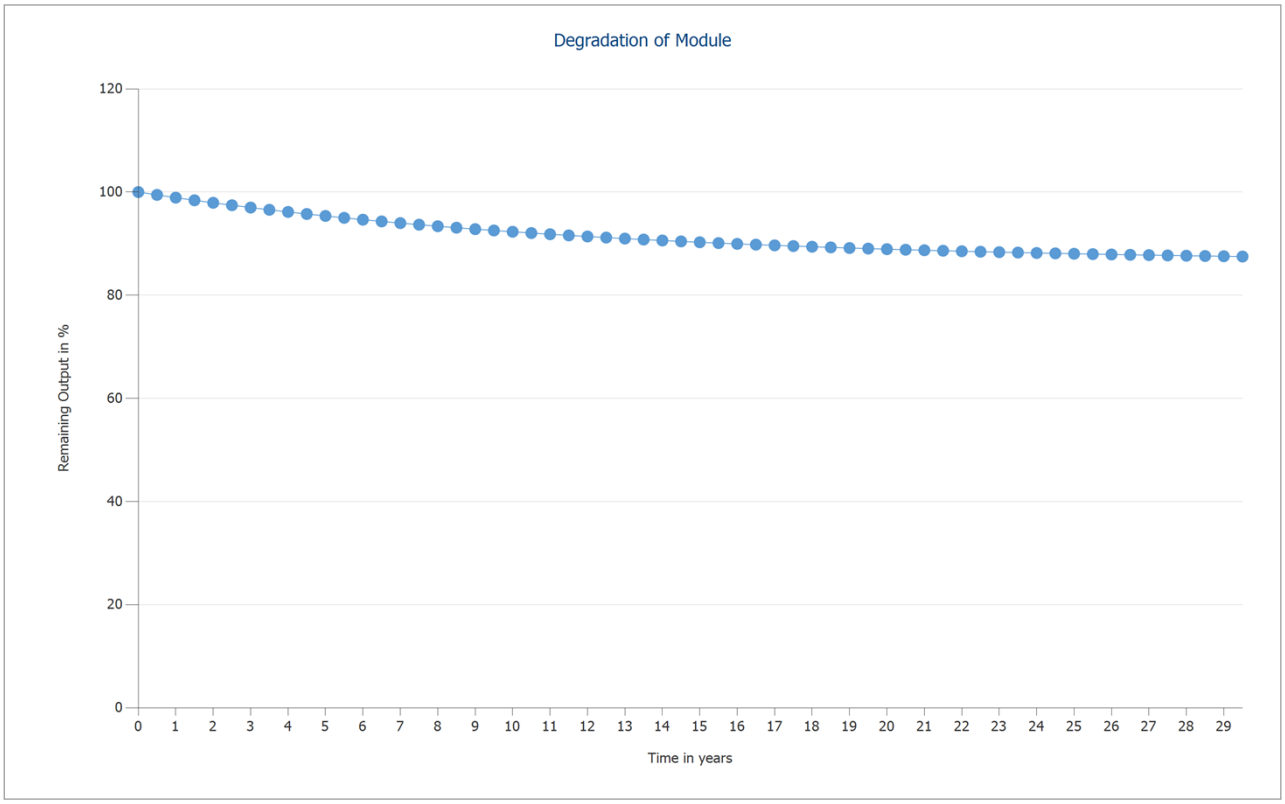


Figure: Degradation of Module, 3. Module Area - Building 04-Roof Area Southwest

4. Module Area - Arbitrary Building 02-Mounting Surface Southwest

PV Generator, 4. Module Area - Arbitrary Building 02-Mounting Surface Southwest

Name	Arbitrary Building 02-Mounting Surface Southwest	
PV Modules	24 x TSM-425-DE09R.08 VERTEX S (v1)	
Manufacturer	Trina Solar	
Inclination	20	°
Orientation	Southwest 209	°
Installation Type	Roof parallel	
PV Generator Surface	48.0	m²

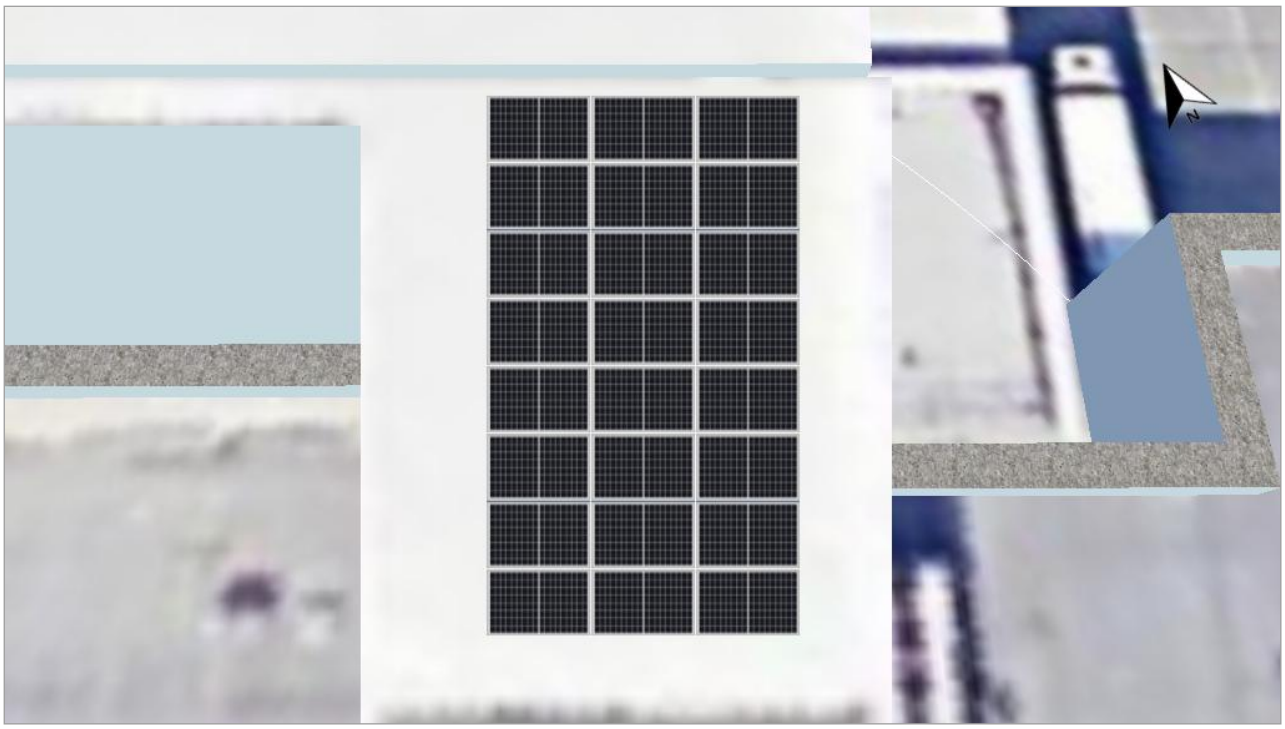


Figure: 4. Module Area - Arbitrary Building 02-Mounting Surface Southwest

Degradation of Module, 4. Module Area - Arbitrary Building 02-Mounting Surface Southwest

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

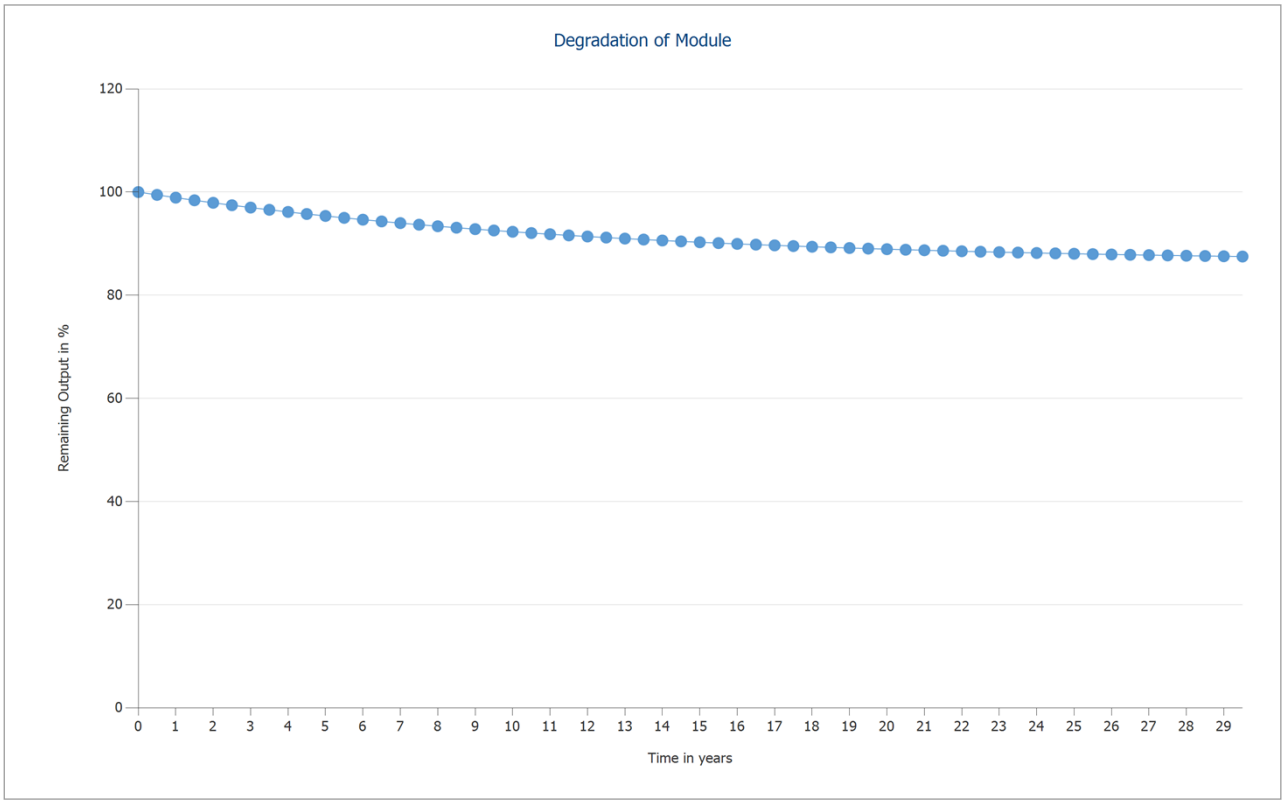


Figure: Degradation of Module, 4. Module Area - Arbitrary Building 02-Mounting Surface Southwest

Horizon Line, 3D Design

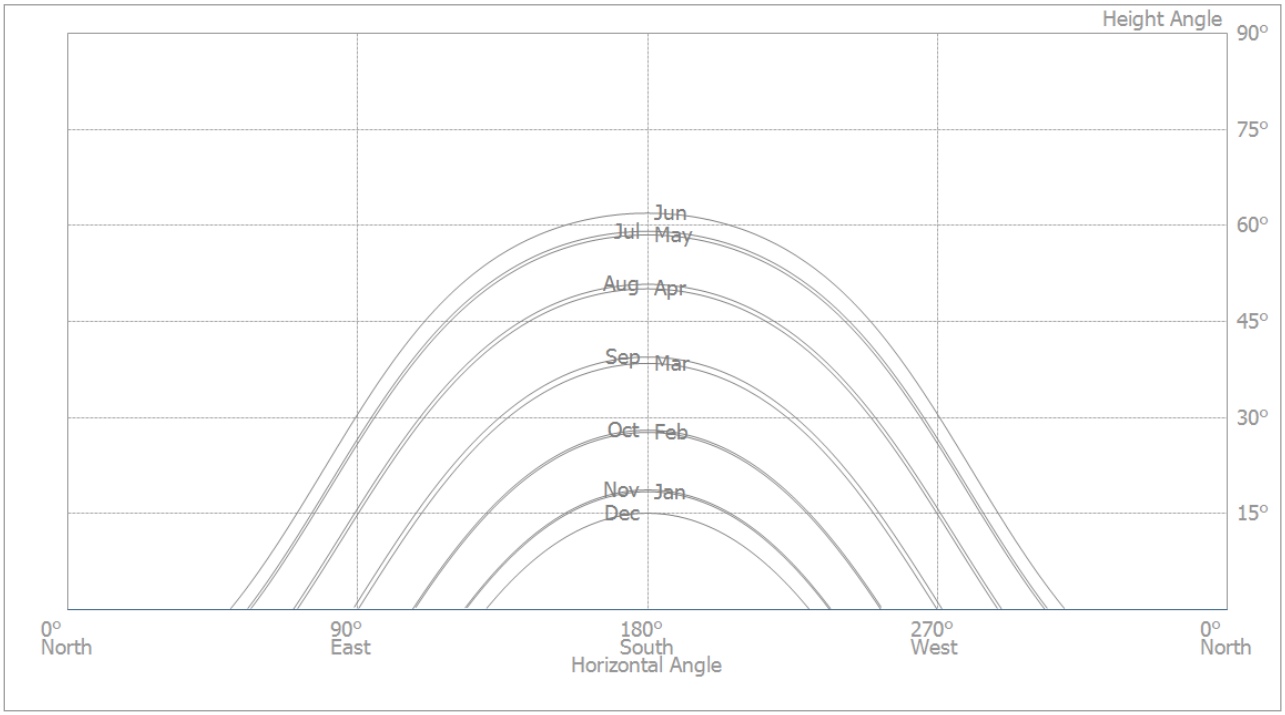


Figure: Horizon (3D Design)

Inverter configuration

Configuration 1

Module Areas	Arbitrary Building 02-Mounting Surface Southwest + Building 04-Roof Area Southwest
Inverter 1	
Model	Solis-80K-5G-PRO (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	108.4 %
Configuration	MPP 1: 2 x 16
	MPP 2: 2 x 16
	MPP 3: 2 x 16
	MPP 4: 2 x 15
	MPP 5: 2 x 20
	MPP 6: 2 x 19

Configuration 2

Module Areas	Building 04-Roof Area Southwest + Arbitrary Building 02-Mounting Surface Southwest
Inverter 1	
Model	Solis-80K-5G-PRO (v1)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	105.2 %
Configuration	MPP 1: 2 x 18
	MPP 2: 2 x 18
	MPP 3: 2 x 17
	MPP 4: 2 x 17
	MPP 5: 2 x 17
	MPP 6: 2 x 12

AC Mains

AC Mains

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

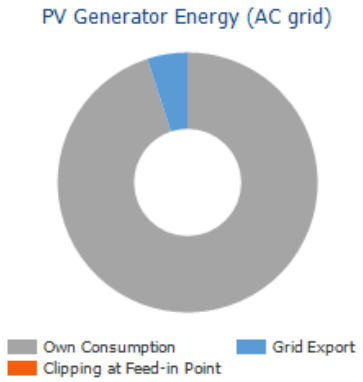
Project Designer: James Burke **Client:** Sainsbury's

Simulation Results

Results Total System

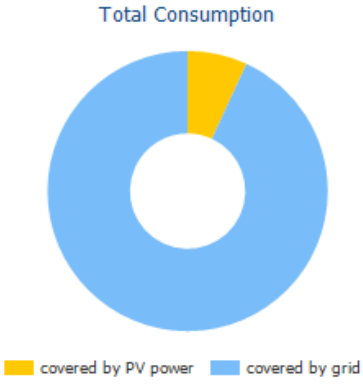
PV System

PV Generator Output	170.85	kWp
Spec. Annual Yield	994.27	kWh/kWp
Performance Ratio (PR)	90.59	%
Yield Reduction due to Shading	1.2	%
PV Generator Energy (AC grid)	169,888	kWh/Year
Own Consumption	161,332	kWh/Year
Clipping at Feed-in Point	0	kWh/Year
Grid Export	8,555	kWh/Year
Own Power Consumption	95.0	%
CO_2 Emissions avoided	38,221	kg / year



Appliances

Appliances	2,340,369	kWh/Year
Standby Consumption (Inverter)	16	kWh/Year
Total Consumption	2,340,385	kWh/Year
covered by PV power	161,332	kWh/Year
covered by grid	2,179,053	kWh/Year
Solar Fraction	6.9	%



Level of Self-sufficiency

Total Consumption	2,340,385	kWh/Year
covered by grid	2,179,053	kWh/Year
Level of Self-sufficiency	6.9	%

Sainsbury's - Hayes

Project Designer: James Burke **Client:** Sainsbury's

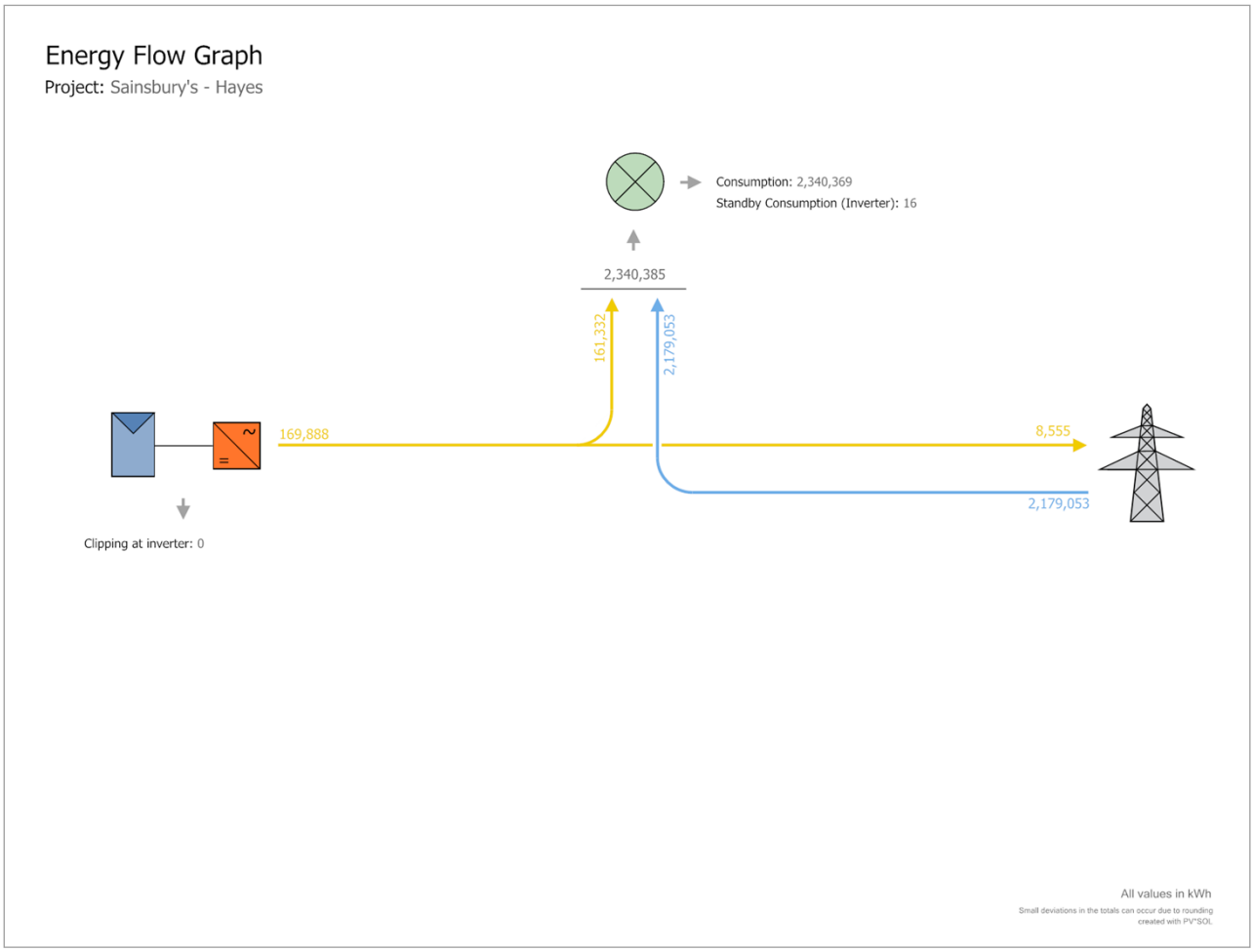


Figure: Energy flow

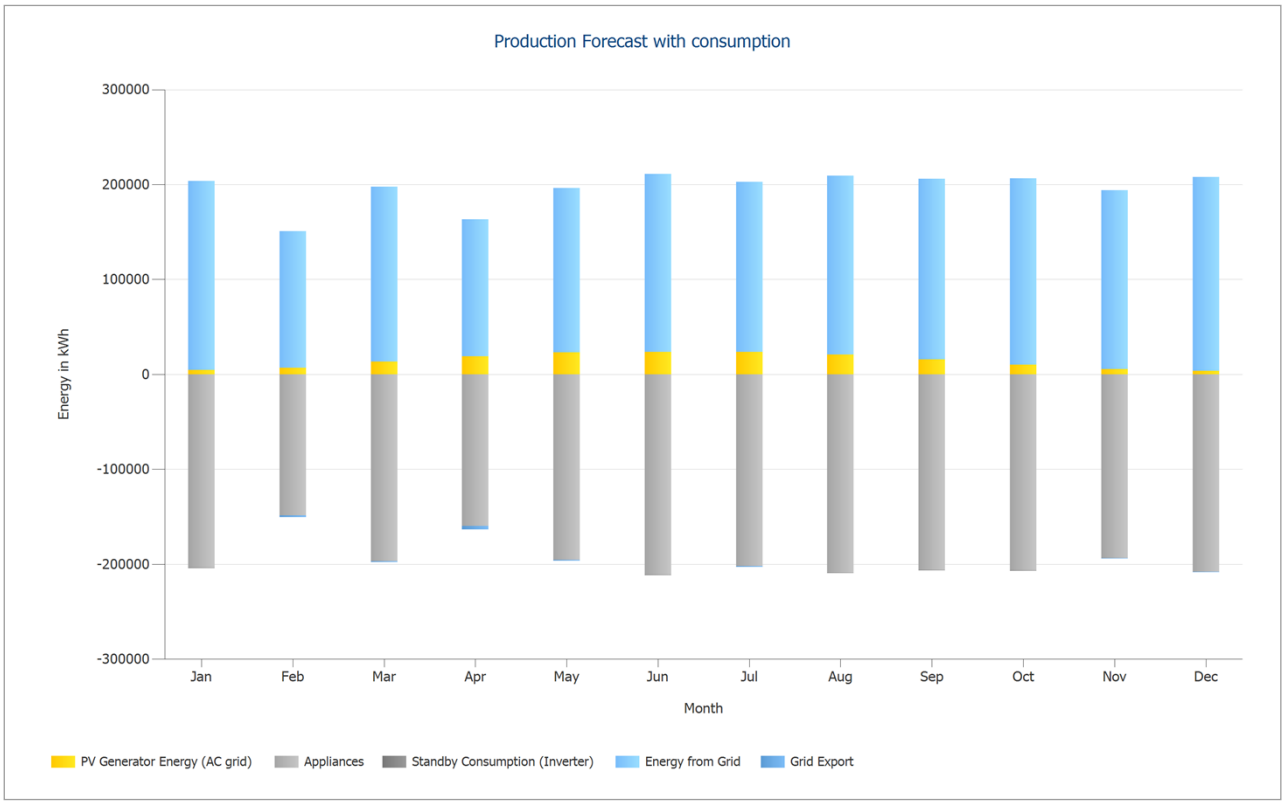


Figure: Production Forecast with consumption

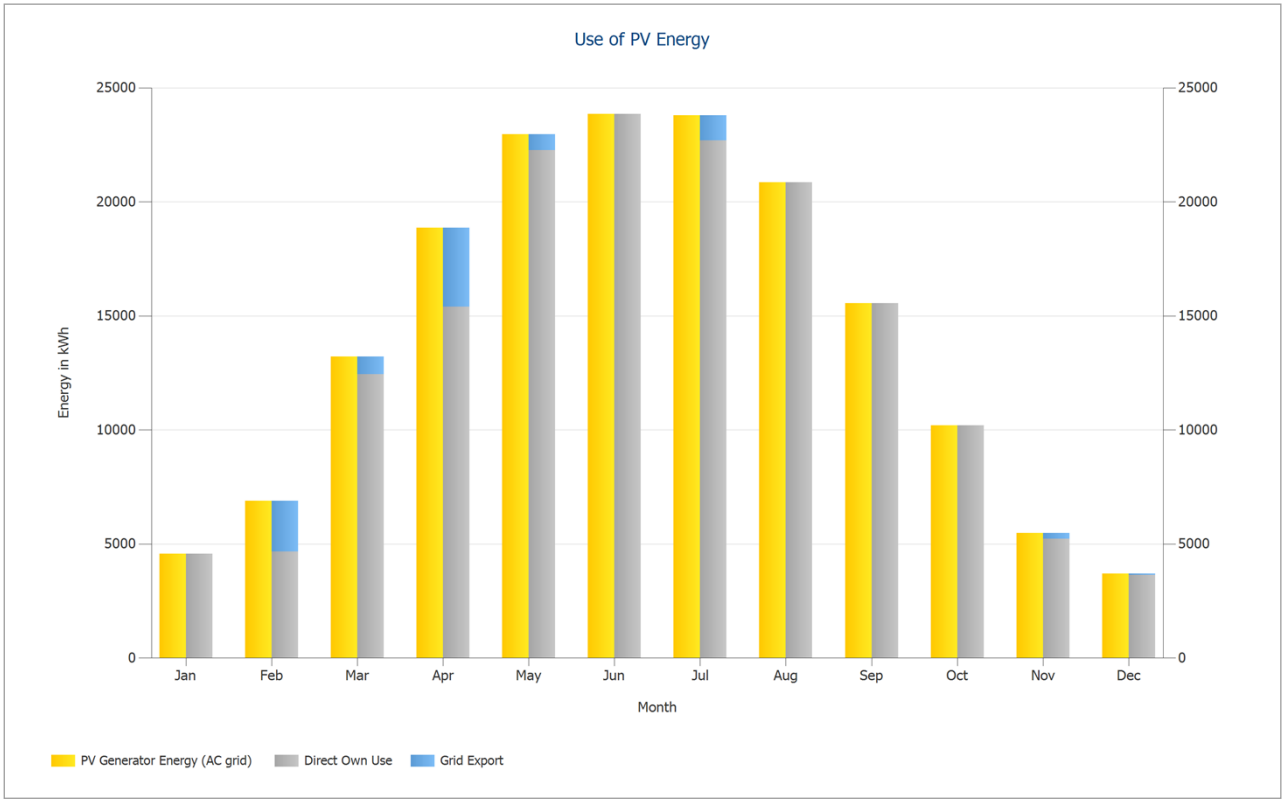


Figure: Use of PV Energy

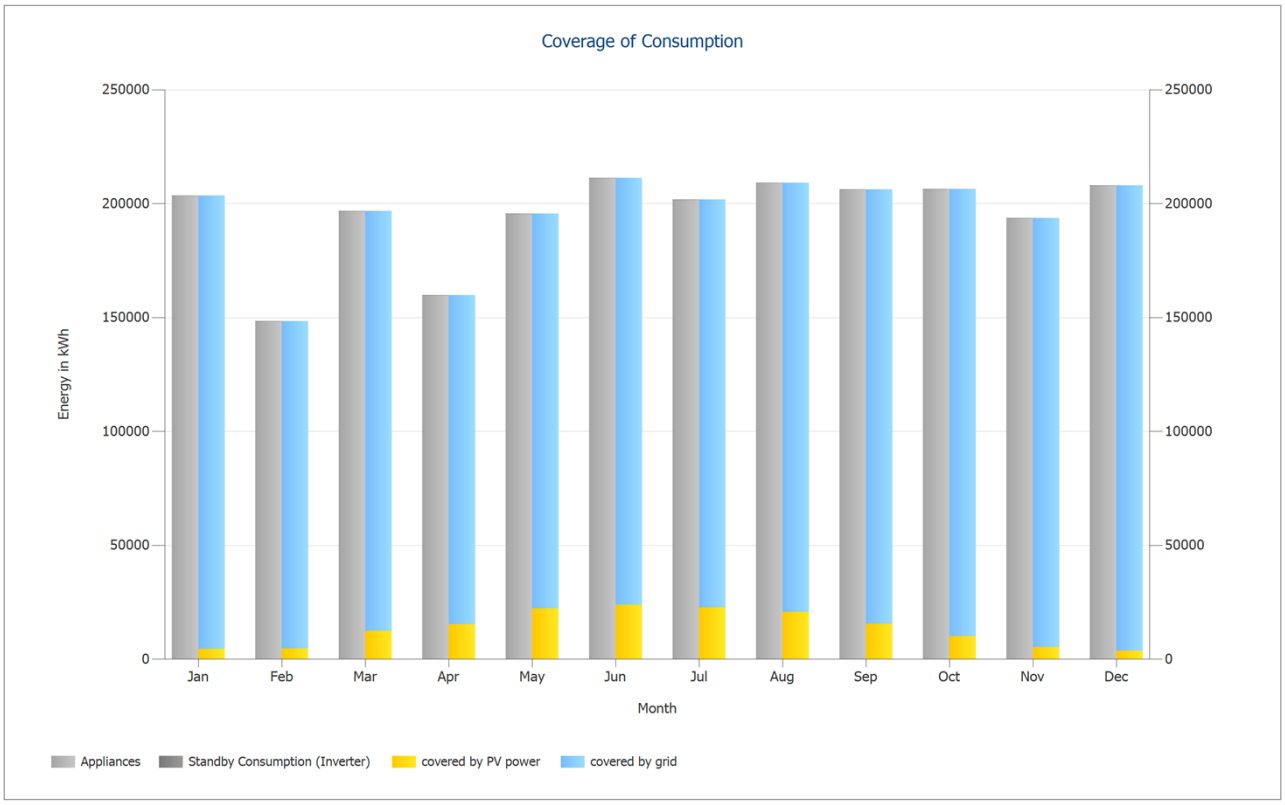


Figure: Coverage of Consumption

Results per Module Area

Arbitrary Building 02-Mounting Surface Southwest

PV Generator Output	53.55	kWp
PV Generator Surface	251.76	m²
Global Radiation at the Module	1125.42	kWh/m²
Global Radiation on Module without reflection	1127.74	kWh/m²
Performance Ratio (PR)	91.07	%
PV Generator Energy (AC grid)	55043.95	kWh/Year
Spec. Annual Yield	1027.90	kWh/kWp

Building 04-Roof Area Southwest

PV Generator Output	33.15	kWp
PV Generator Surface	155.85	m²
Global Radiation at the Module	1075.63	kWh/m²
Global Radiation on Module without reflection	1078.12	kWh/m²
Performance Ratio (PR)	90.42	%
PV Generator Energy (AC grid)	32343.03	kWh/Year
Spec. Annual Yield	975.66	kWh/kWp

Building 04-Roof Area Southwest

PV Generator Output	73.95	kWp
PV Generator Surface	347.67	m²
Global Radiation at the Module	1075.63	kWh/m²
Global Radiation on Module without reflection	1078.12	kWh/m²
Performance Ratio (PR)	90.32	%
PV Generator Energy (AC grid)	72075.19	kWh/Year
Spec. Annual Yield	974.65	kWh/kWp

Arbitrary Building 02-Mounting Surface Southwest

PV Generator Output	10.20	kWp
PV Generator Surface	47.95	m²
Global Radiation at the Module	1125.42	kWh/m²
Global Radiation on Module without reflection	1127.74	kWh/m²
Performance Ratio (PR)	90.56	%
PV Generator Energy (AC grid)	10425.55	kWh/Year
Spec. Annual Yield	1022.11	kWh/kWp

Plans and parts list

Circuit Diagram

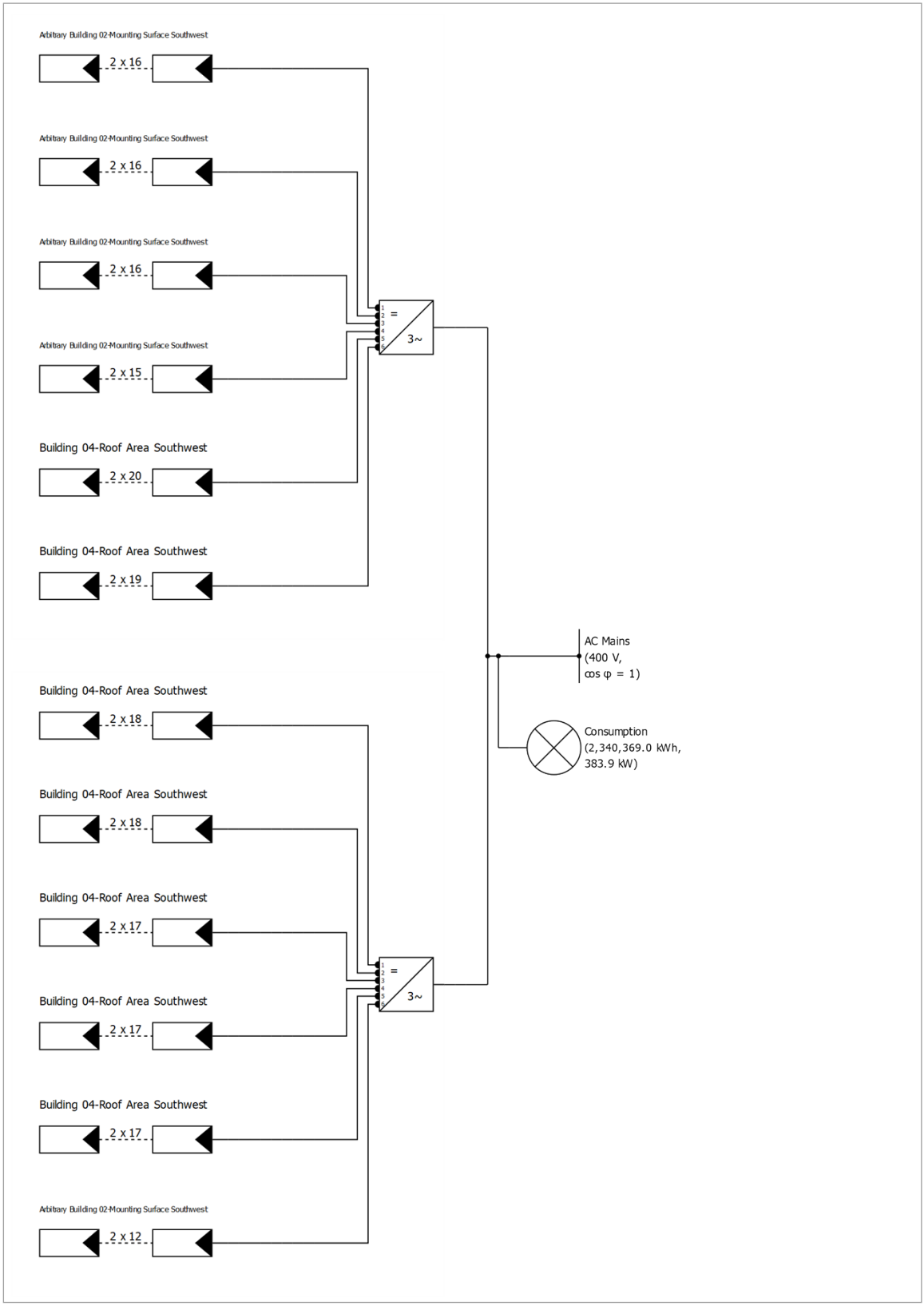


Figure: Circuit Diagram

Overview plan

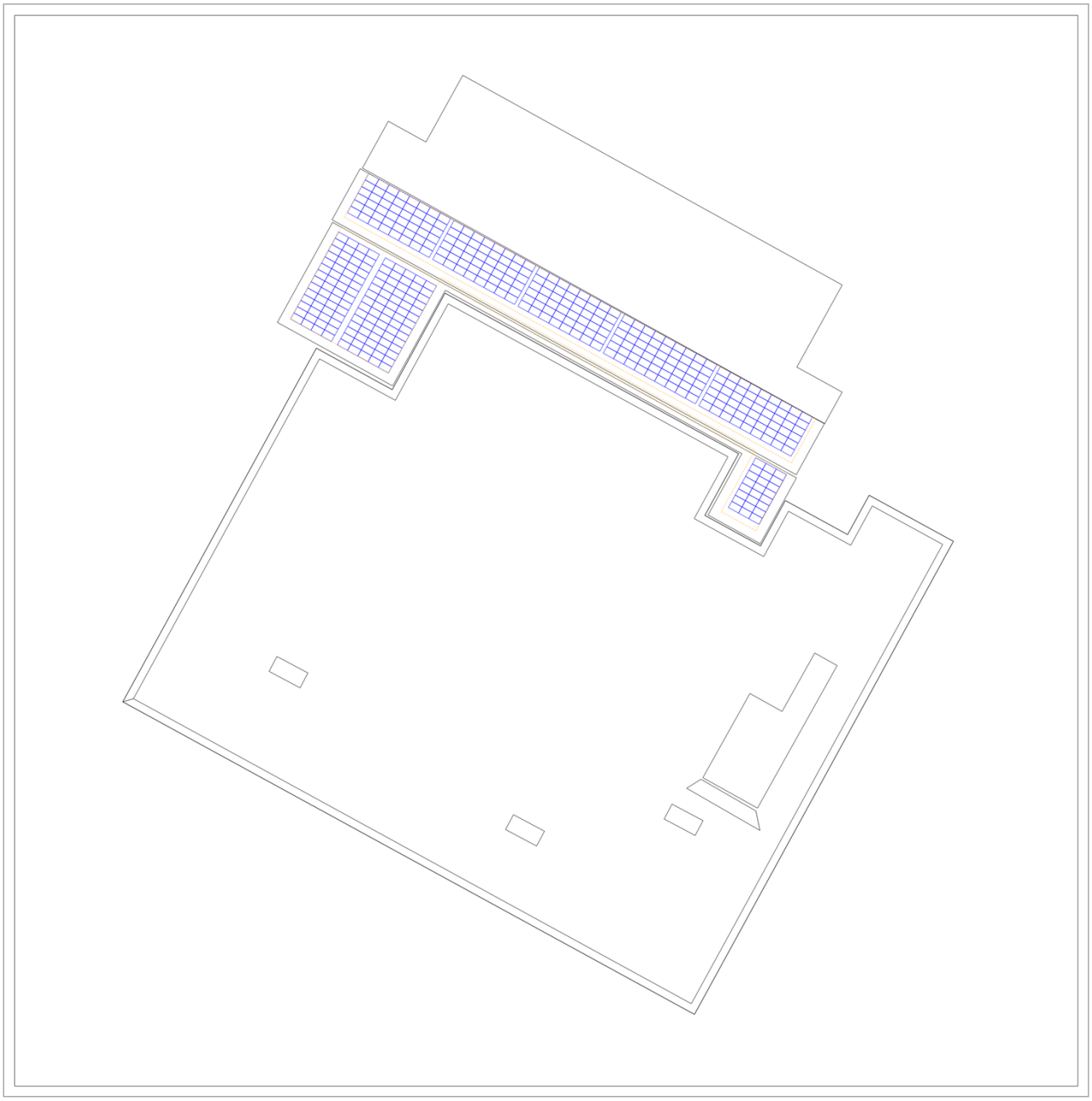


Figure: Overview plan

Dimensioning Plan

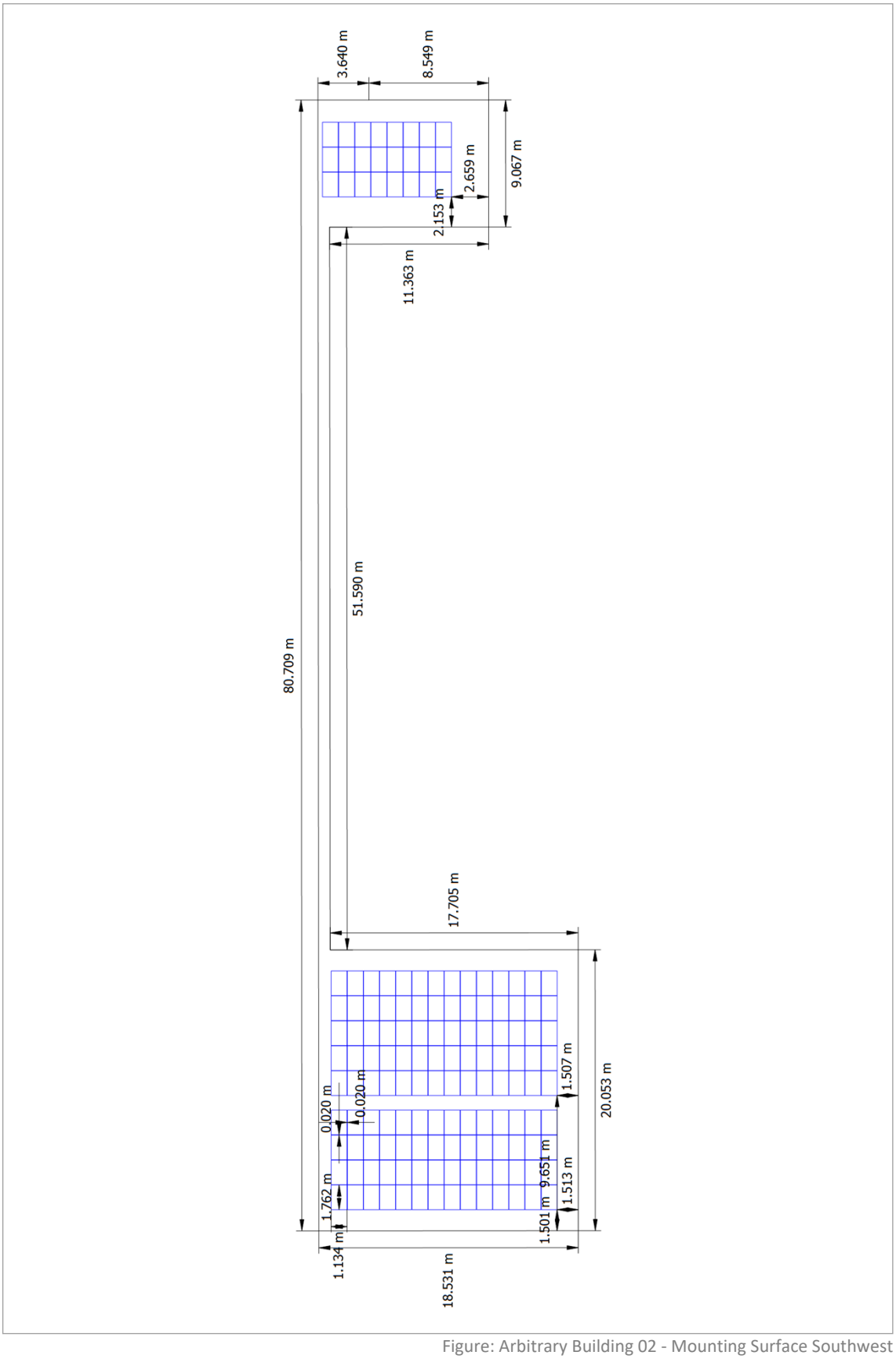


Figure: Arbitrary Building 02 - Mounting Surface Southwest

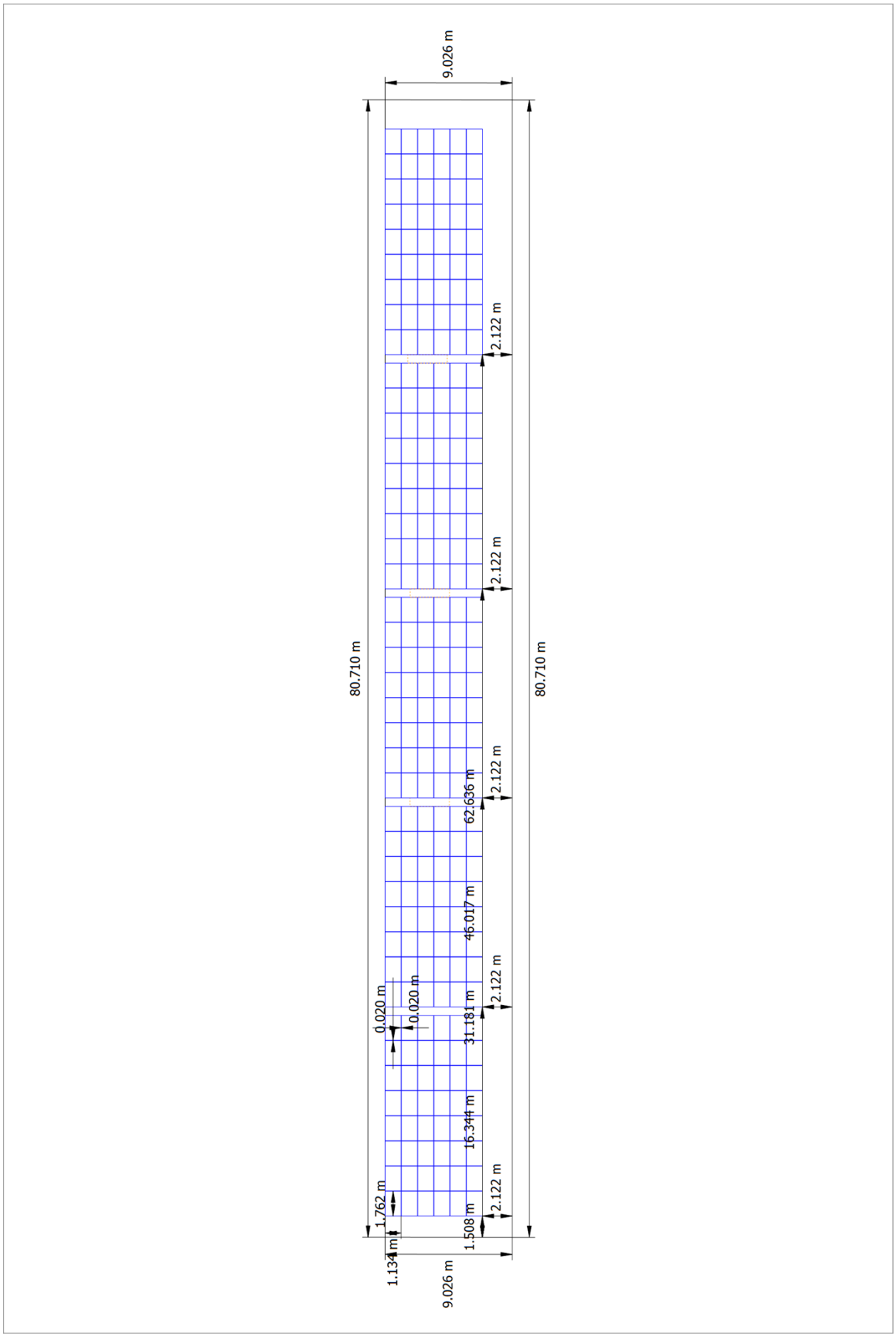


Figure: Building 04 - Roof Area Southwest

String Plan

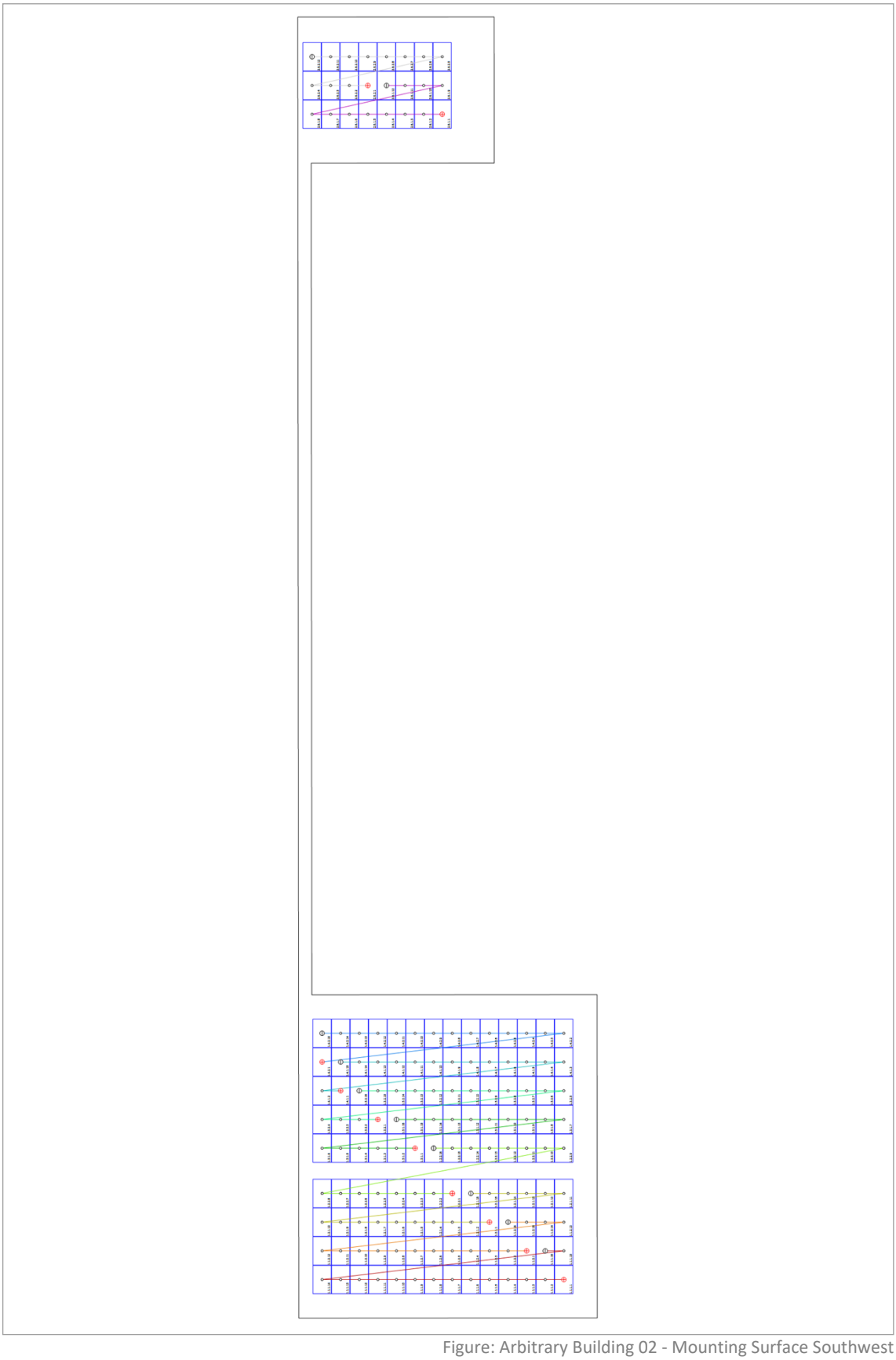


Figure: Arbitrary Building 02 - Mounting Surface Southwest

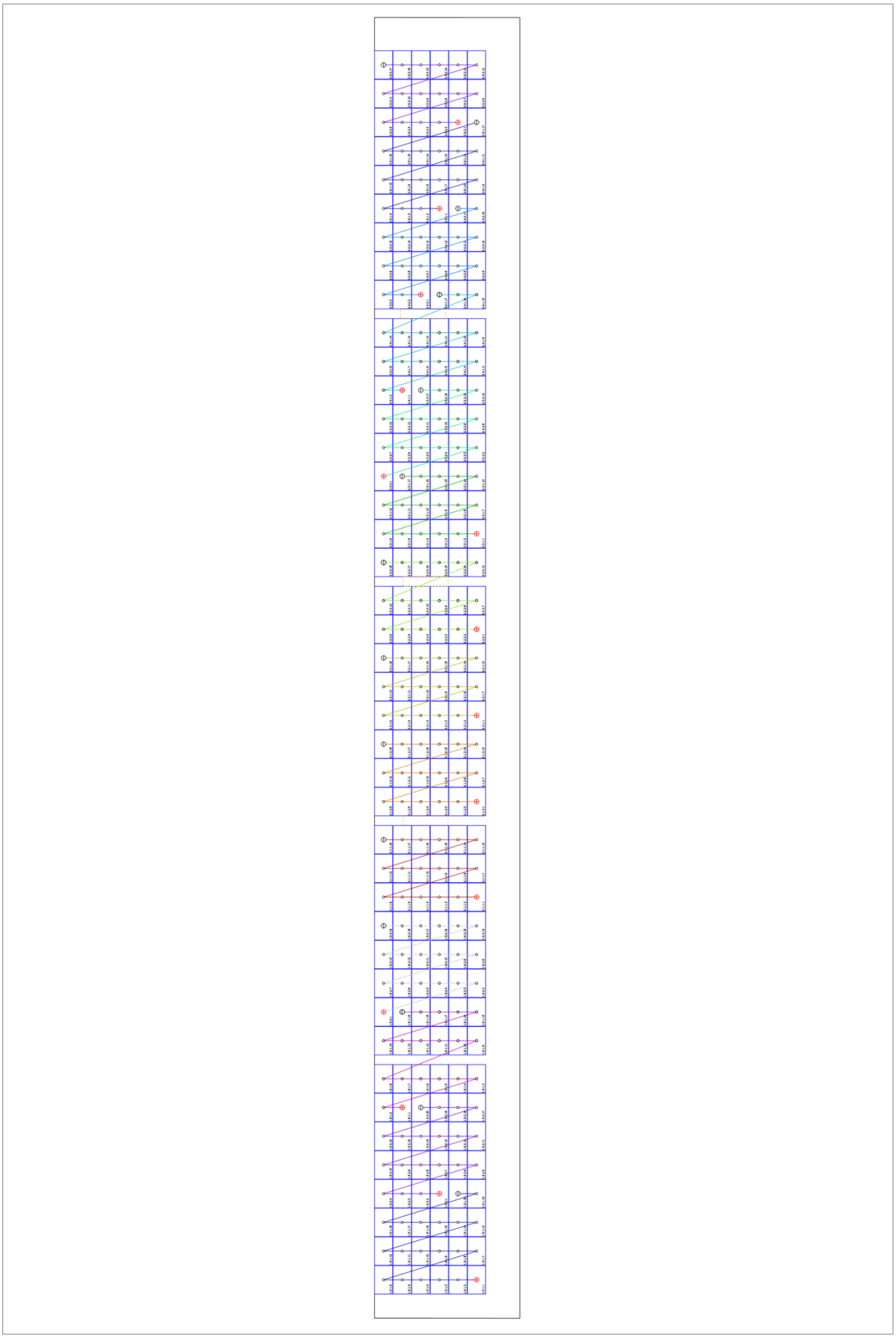


Figure: Building 04 - Roof Area Southwest

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		Trina Solar	TSM-425-DE09R.08 VERTEX S	402	Piece
2	Inverter		Ginlong (Solis)	Solis-80K-5G-PRO	2	Piece