PV Solar Survey Form

Project Reference:	**SPUK468782**	**Surveyor:**	**W SMEE**	**Date of survey:**	30/11/23
Customer Name:	**JANE HEARD**				
Address:	**28 BEESFIELD LANE FARNINGHAM KENT DA4 0BZ**				
Site Address (if different to above):					
Contact Details	**Telephone:**		**Mob**	[redacted]	
	Email:	[redacted]			

Planning	
Is the property ~~Listed~~ or in a Conservation Area?	**YES**
Will the installation come under "Permitted Development"?	**NO**
Are there any other planning issues to be considered?	**TBC**
Is the current roof lining under an active warranty? If so, the warranty provider should be consulted as to whether the installation of the system will void or in any way affect the warranty.	**NO**

System Design	
Building use – domestic or commercial?	**DOMESTIC**
Will the proposed system be roof, wall or ground mounted?	**ROOF**

Roof Assessment	
General roof condition:	**GOOD**
Is the property in an exposed location?	**NO**

PV Solar Survey Form

Inclination of roof from horizontal:	**37 DEG**
Roof slope length, ridge to eaves:	**4.5 M**
Lower width – gable to gable:	**5.4 M**
Upper width – if different:	**SAME**
Gutter height above ground:	**5.0 M**
Is the installation likely to result in the loading on the roof structure increasing by 15% or more? Any prior increase in the loading of the structure must be taken into account	**NO**
Are there any obstacles that will cause shading issues? (Chimneys, windows etc.).	**VELUX**
Is there a likelihood that significant overshading issues could occur in the future e.g. tree growth?	**NO**
Are there any access issues?	**NO**
Location of scaffolding	**REAR , NOTE LOWER EXTENSION**

System Data – Sunpath and shading assessment is required from the base of each array facing SOUTH	
Is any shading present within 10m of the proposed array?	**NO**

Electricity Consumption	
Assumed occupancy archetype	**HOME ALL DAY**
Does property have electric space heating, electric hot water or electric vehicle charging loads?	EV
Is property on a split tariff meter (e.g. Economy 7)? If Yes answer below two questions	E7

Battery Storage	
Battery Storage (EESS) included?	YES

PV Solar Survey Form

Electrical Assessment	
Proposed method of connection to the Consumer Unit?	NEW CU TO HALL CUPBOARD
Is the existing electrical installation in good condition?	UNKNOWN
What is the distance from the Consumer Unit to the proposed location of the inverter and what is the estimated voltage drop?	15 M 0.052 V
Have regulatory periodic inspection and testing requirements been met?	NO
Is main earthing and bonding in place?	YES
Conduit Colour	BLACK
Cable route AC	EXTERNAL SIDE
Cable route DC	DIRECT THROUGH TILES

Proposed Location of Key Components	
Proposed location of Inverter:	LOFT
Proposed location of Batteries:	LOFT
Proposed location of Generation Meter:	LOFT
Proposed location of the DC Disconnect and AC isolator:	INTEGERAL
Do the proposed locations of the above meet with both the regulatory requirements and the customer's expectations?	YES

Please note: layout or number of panels may vary when the installation takes place, due to the limitations of surveying the roof from the ground (if a roof survey was done in this manner). Therefore the estimates generated for the system may vary also.

Customer Signature	[redacted]
Date	[redacted] 25/01/24.

South East Solar & Electrical Ltd
Unit 16 Rochester Trade Park, Maidstone Road
ME1 3QY

Jane Heard
28 Beesfield Lane
Farningham
Dartford
DA4 0BZ

Contact person:
Jon Webb
Phone: 01634 553422
E-Mail: Jon@southeastsolar.co.uk

Customer No.: SPUK468782
Project Name: SPUK468782
Offer no.: SPUK468782

14/12/2023

Your PV system from South East Solar & Electrical Ltd

Address of Installation

28 Beesfield Lane
Farningham
Dartford
DA4 0BZ

Project Description:
Forecasting reports are calculated assuming a rate of inflation slightly below the prevailing rate reported by The Office of National Statistics's Consumer Price Index.

Project Overview

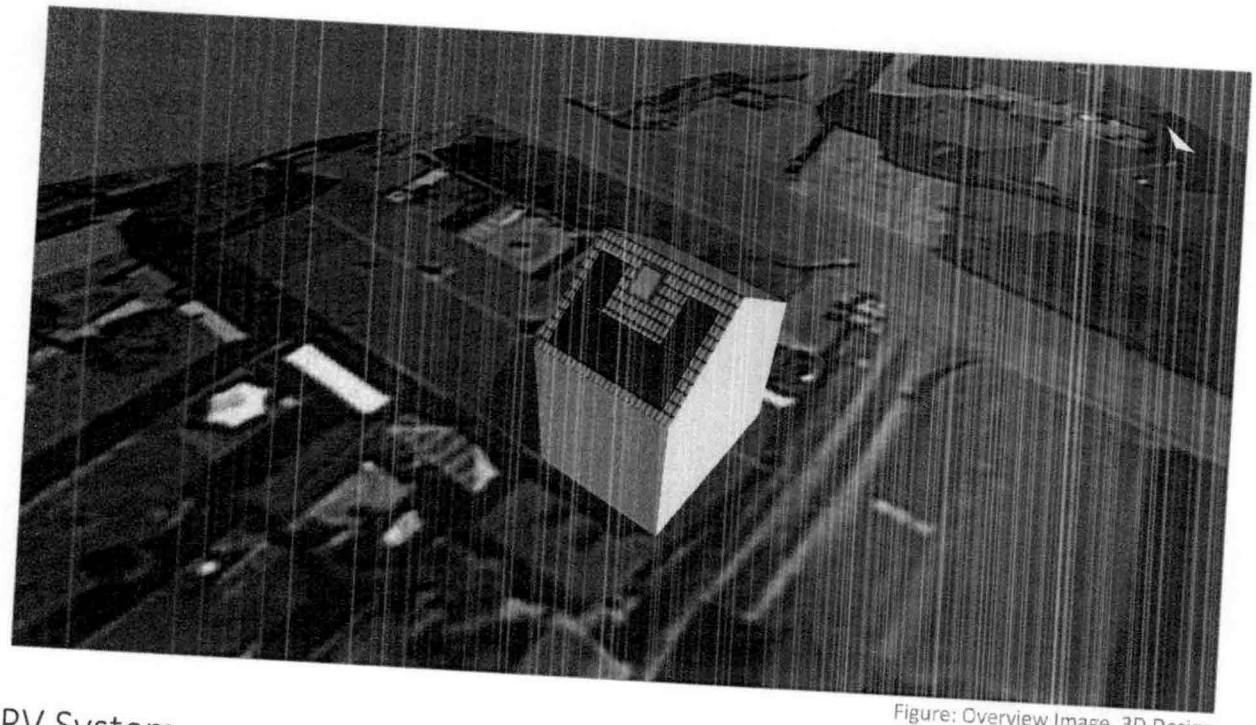


Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System with Electrical Appliances and Battery Systems

Climate Data	Gravesend Broadnes, GBR (1996 - 2015)
Values source	Meteonorm 8.1
PV Generator Output	2.43 kWp
PV Generator Surface	11.7 m²
Number of PV Modules	6
Number of Inverters	1
No. of battery systems	1

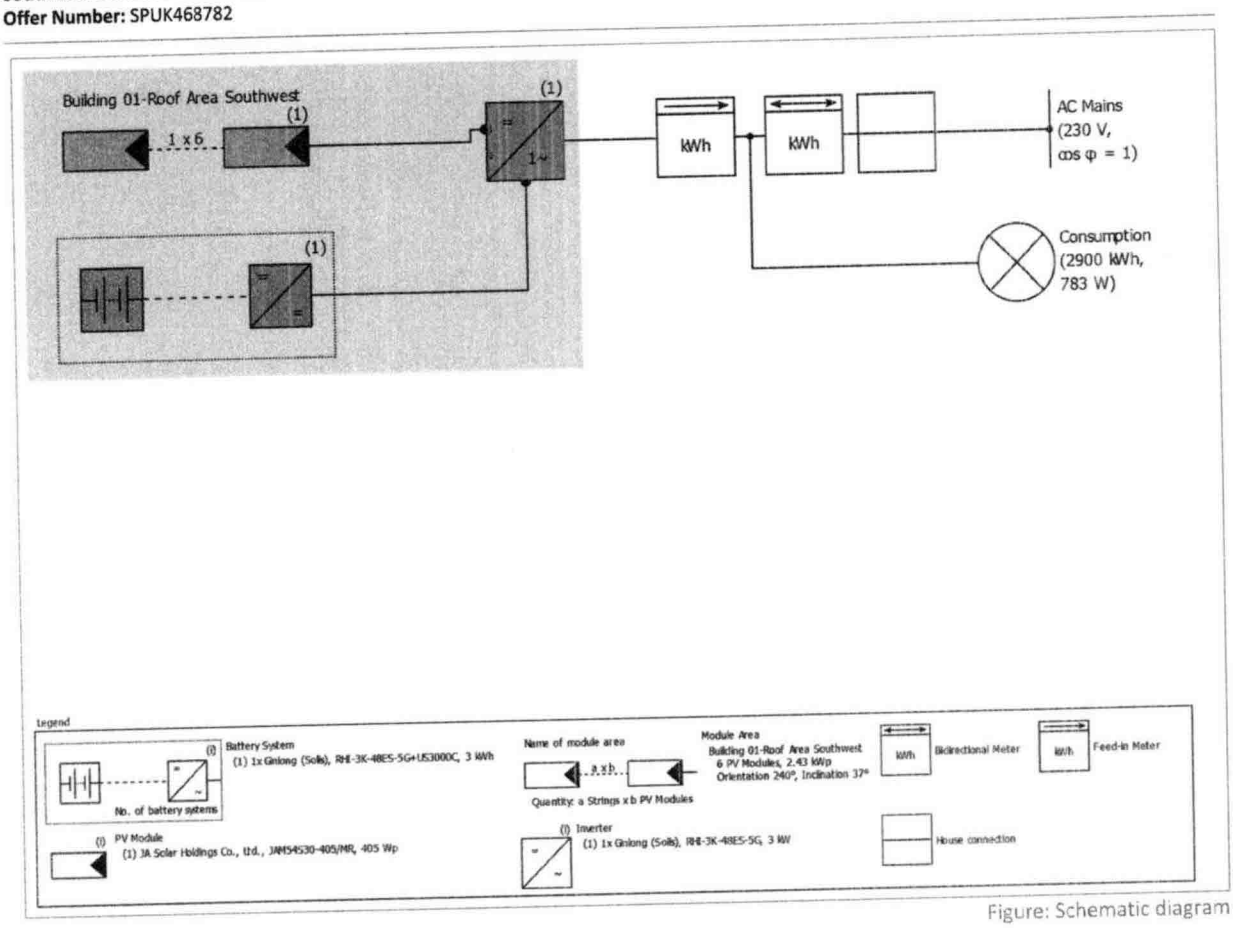


Figure: Schematic diagram

Production Forecast

Production Forecast	
PV Generator Output	2.43 kWp
Spec. Annual Yield	925.05 kWh/kWp
Performance Ratio (PR)	86.90 %
Yield Reduction due to Shading	1.7 %
PV Generator Energy (AC grid) with battery	2,121 kWh/Year
Direct Own Use	1,531 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	590 kWh/Year
Own Power Consumption	72.1 %
CO_2 Emissions avoided	929 kg / year
Level of Self-sufficiency	52.7 %

Financial Analysis

Your Gain	
Total investment costs	5,431.00 £
Internal Rate of Return (IRR)	13.46 %
Amortization Period	8.3 Years
Electricity Production Costs	0.1028 £/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 and Battery Systems
Start of Operation	08/11/2023

Climate Data

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

Consumption

Total Consumption	2900 kWh
UK Household	2900 kWh
Load Peak	0.8 kW

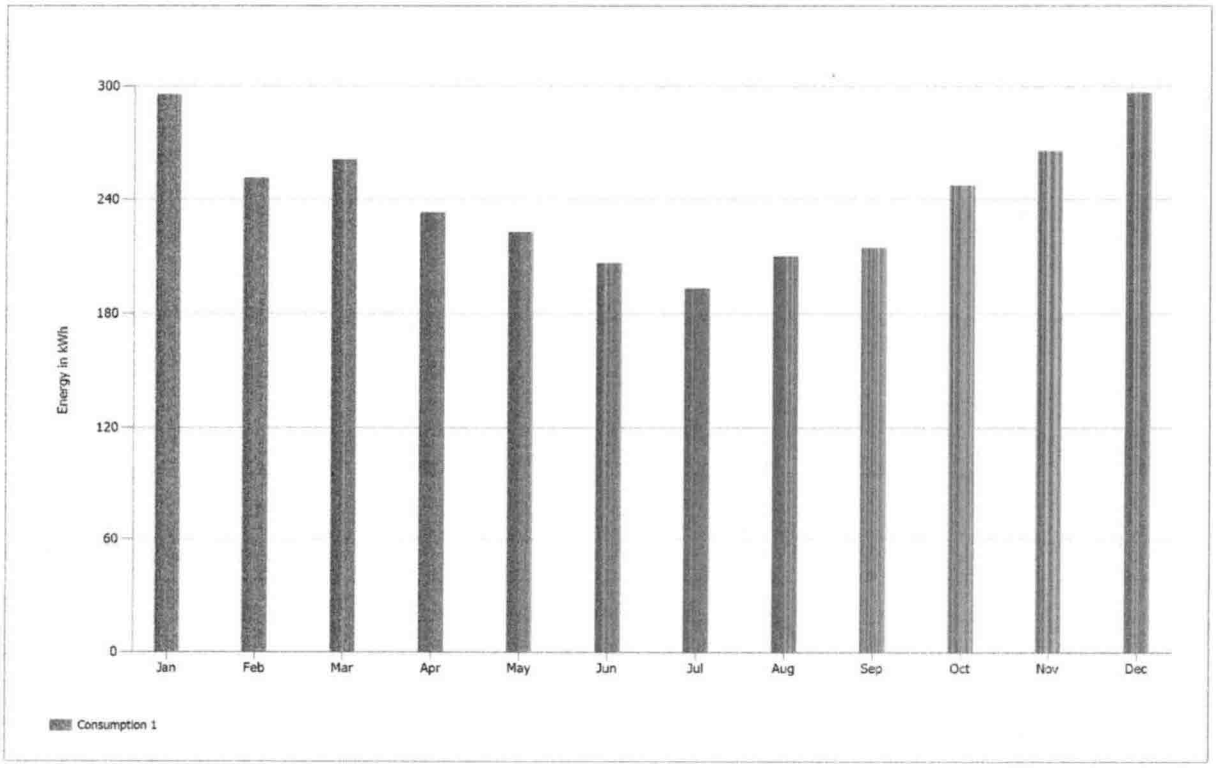


Figure: Consumption

Module Areas

1. Module Area - Building 01-Roof Area Southwest

PV Generator, 1. Module Area - Building 01-Roof Area Southwest

Name	Building 01-Roof Area Southwest
PV Modules	6 x JAM54S30-405/MR (v3)
Manufacturer	JA Solar Holdings Co., Ltd.
Inclination	37 °
Orientation	Southwest 240 °
Installation Type	Roof parallel
PV Generator Surface	11.7 m²

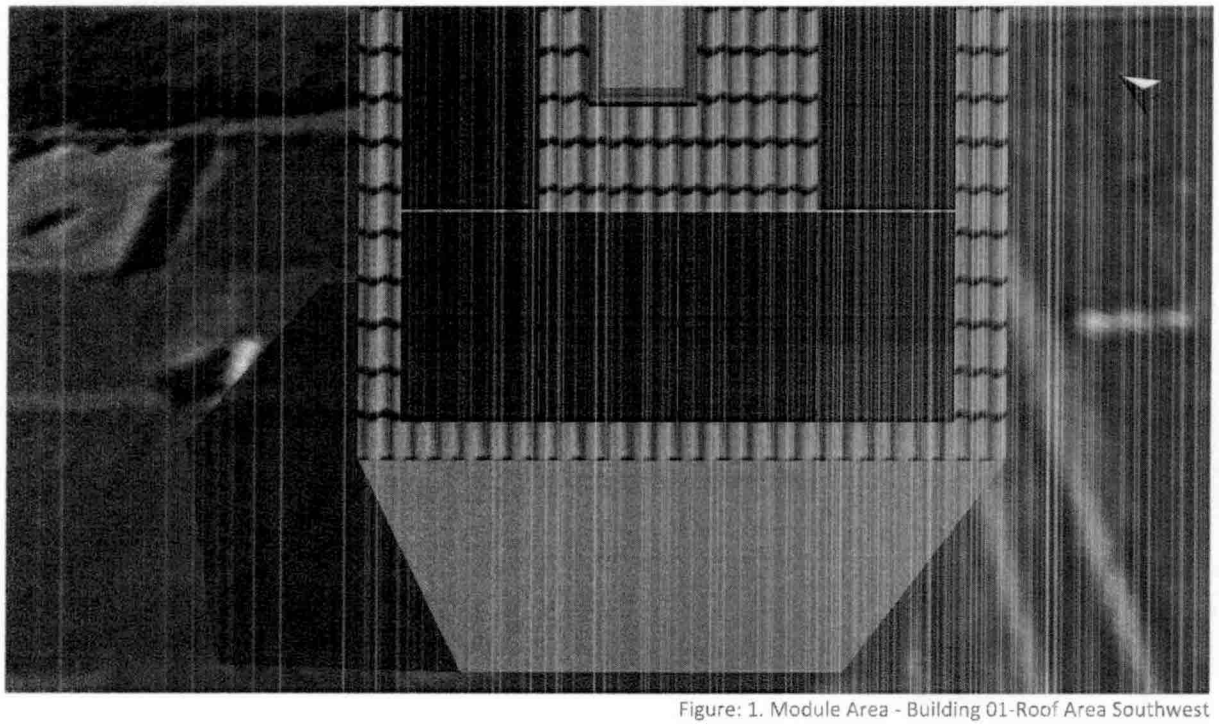


Figure: 1. Module Area - Building 01-Roof Area Southwest

Horizon Line, 3D Design

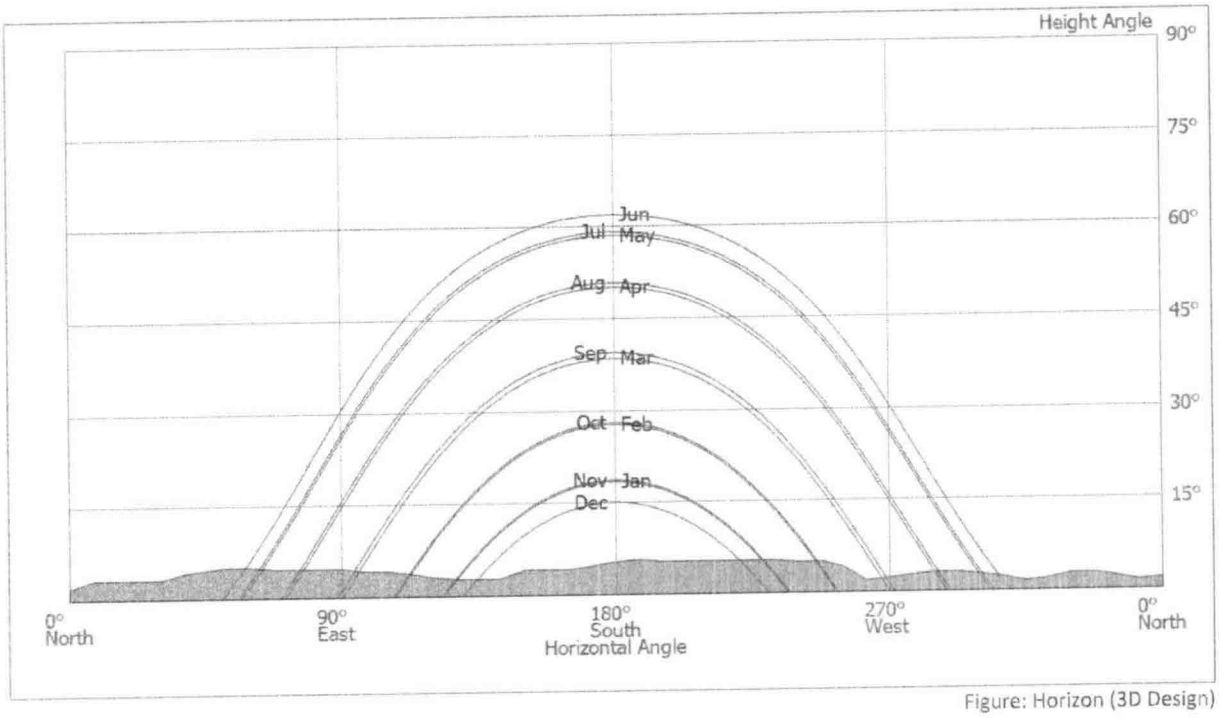


Figure: Horizon (3D Design)

Inverter configuration

Configuration 1	
Module Area	Building 01-Roof Area Southwest
Inverter 1	
Model	RHI-3K-48ES-5G (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Sizing Factor	81 %
Configuration	MPP 1: 1 x 6
	MPP 2: not allocated

AC Mains

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

Battery Systems

Battery System - Group1

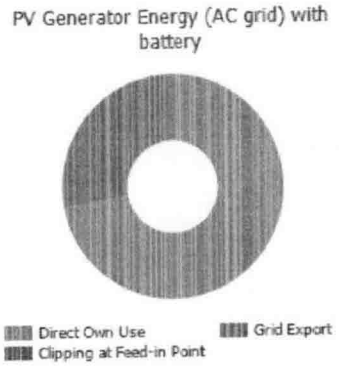
Model	RHI-3K-48ES-5G+US3000C (v2)
Manufacturer	Ginlong (Solis)
Quantity	1
Battery Inverter	
Type of Coupling	DC intermediate circuit coupling
Nominal output	3 kW
Battery	
Manufacturer	Pylon Technologies Co., Ltd.
Model	US3000C (v1)
Quantity	1
Battery Energy	3 kWh
Battery Type	Lithium iron phosphate

Simulation Results

Results Total System

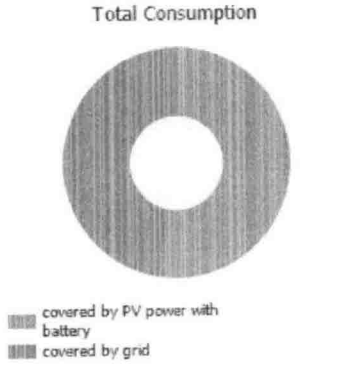
PV System

PV Generator Output	2.43 kWp
Spec. Annual Yield	925.05 kWh/kWp
Performance Ratio (PR)	86.90 %
Yield Reduction due to Shading	1.7 %
PV Generator Energy (AC grid) with battery	2,121 kWh/Year
Direct Own Use	1,531 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	590 kWh/Year
Own Power Consumption	72.1 %
CO_2 Emissions avoided	929 kg / year



Appliances

Appliances	2,900 kWh/Year
Standby Consumption (Inverter)	8 kWh/Year
Total Consumption	2,908 kWh/Year
covered by PV power with battery	1,531 kWh/Year
covered by grid	1,376 kWh/Year
Solar Fraction	52.7 %



Battery System

Charge at beginning	3 kWh
Battery Charge (PV System)	797 kWh/Year
Battery Energy for the Covering of Consumption	663 kWh/Year
Battery discharge into the grid	0 kWh/Year
Losses due to charging/discharging	119 kWh/Year
Losses in Battery	19 kWh/Year
Cycle Load	4.9 %
Service Life	>20 Years

Level of Self-sufficiency

Total Consumption	2,908 kWh/Year
covered by grid	1,376 kWh/Year
Level of Self-sufficiency	52.7 %

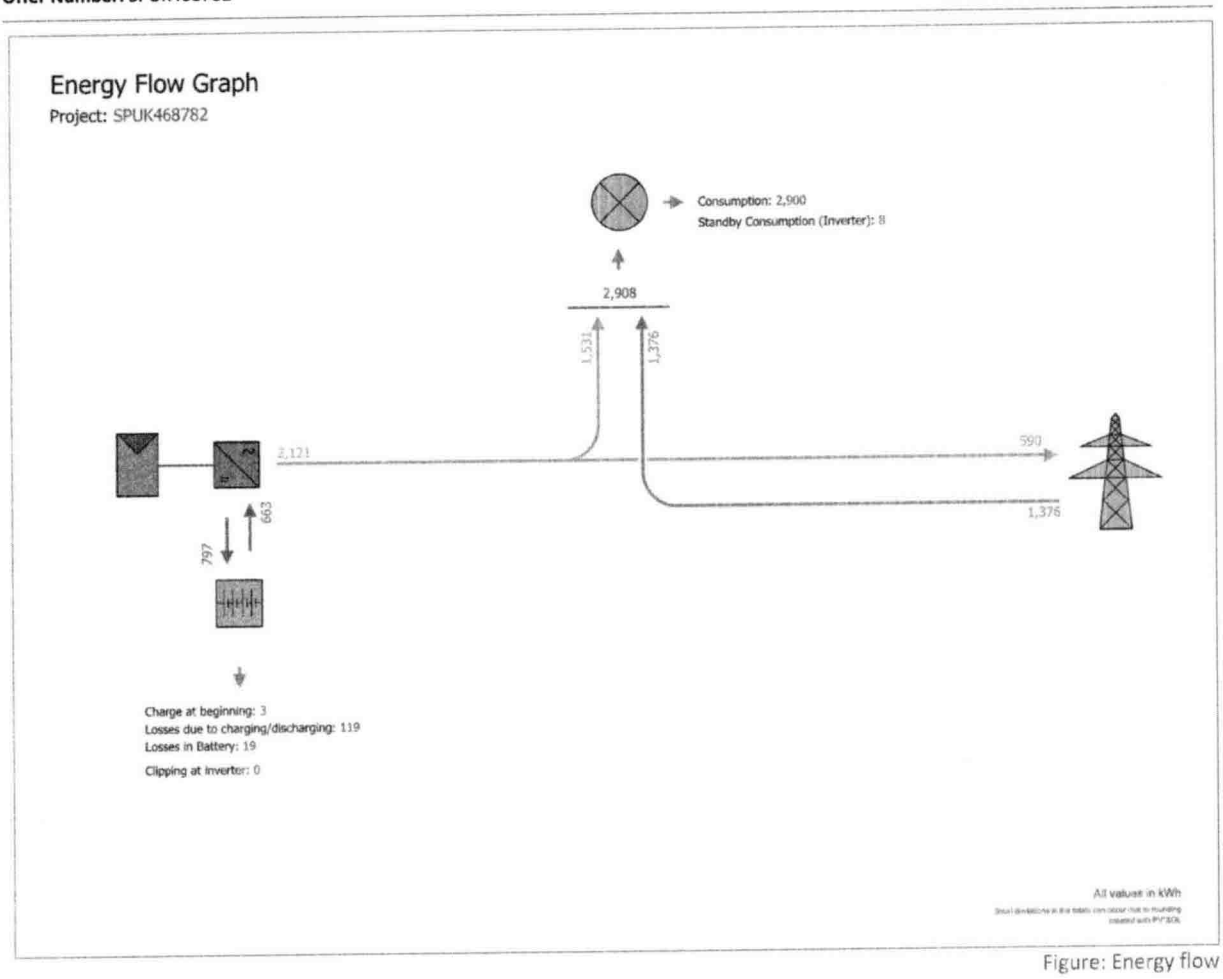


Figure: Energy flow

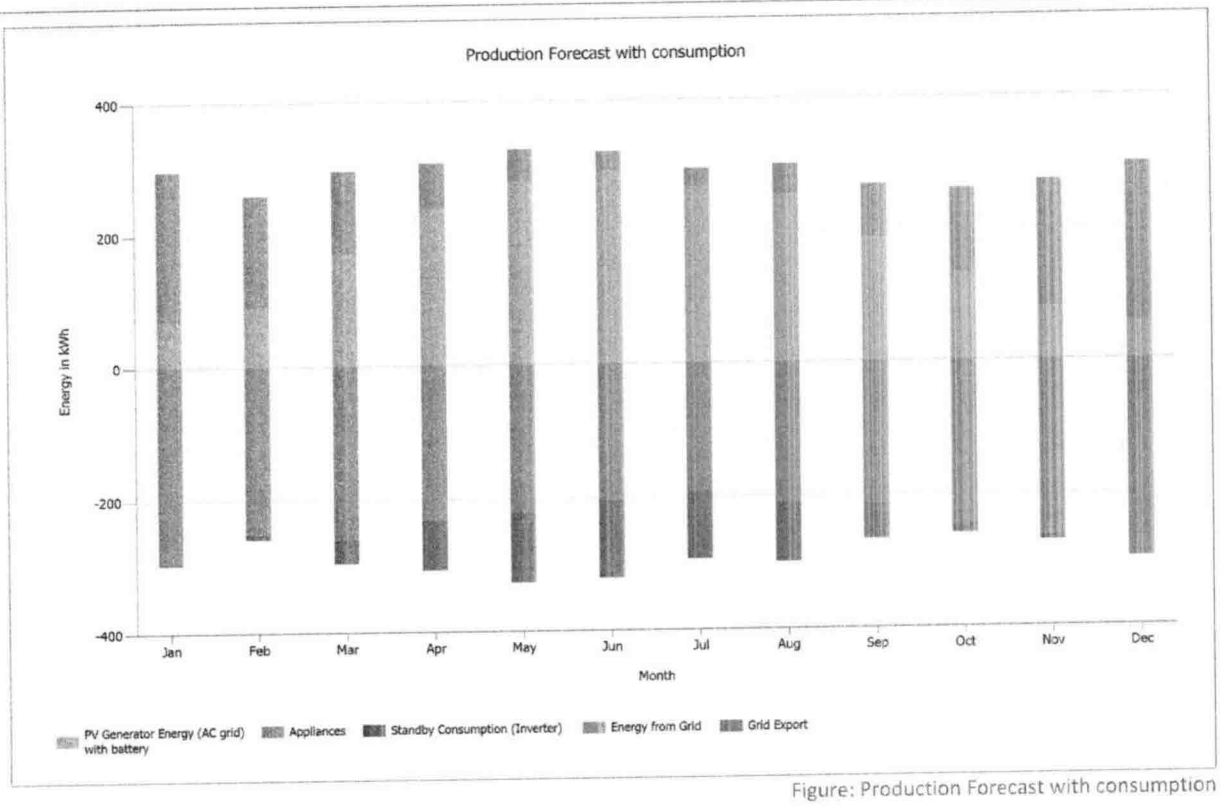


Figure: Production Forecast with consumption

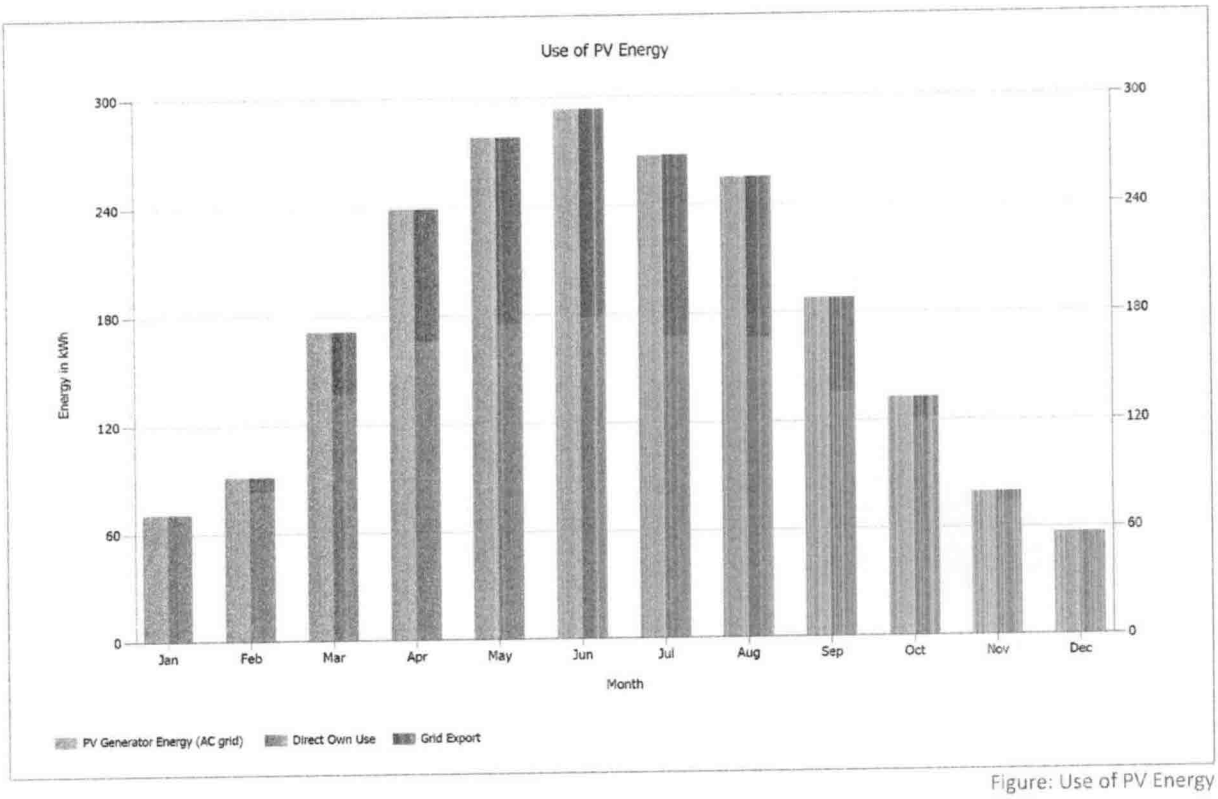


Figure: Use of PV Energy

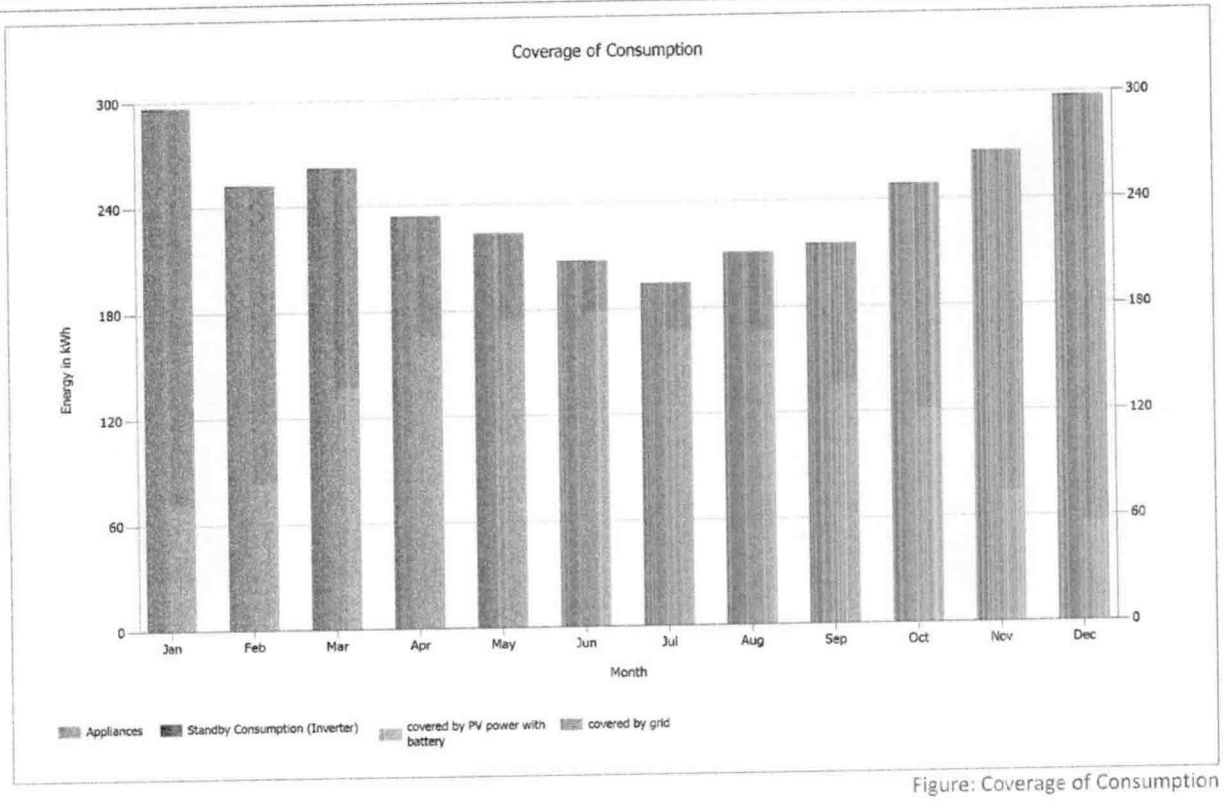


Figure: Coverage of Consumption

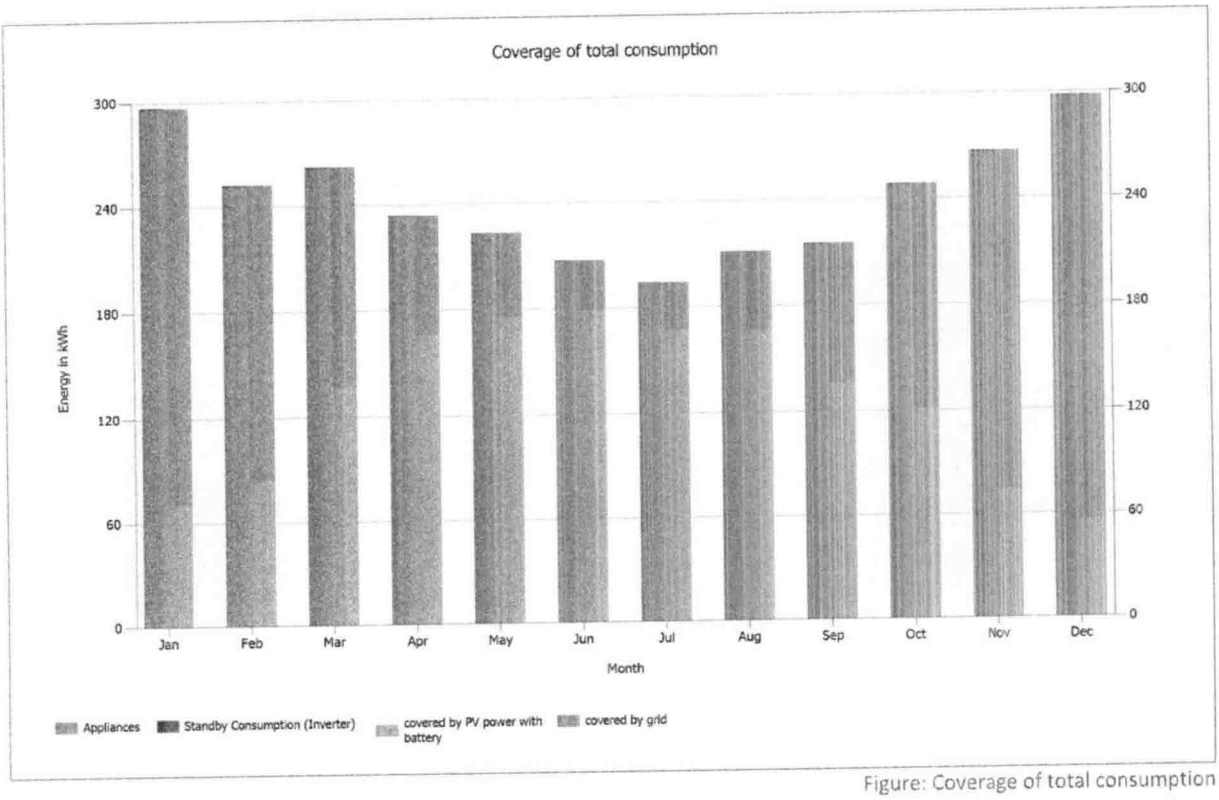


Figure: Coverage of total consumption

Financial Analysis

Overview

System Data	
Grid Export in the first year (incl. module degradation)	586 kWh/Year
PV Generator Output	2.4 kWp
Start of Operation of the System	08/11/2023
Assessment Period	25 Years
Interest on Capital	0 %

Economic Parameters	
Internal Rate of Return (IRR)	13.46 %
Accrued Cash Flow (Cash Balance)	20,187.73 £
Amortization Period	8.3 Years
Electricity Production Costs	0.1028 £/kWh

Payment Overview	
Specific Investment Costs	2,234.98 £/kWp
Investment Costs	5,431.00 £
One-off Payments	0.00 £
Incoming Subsidies	0.00 £
Annual Costs	0.00 £/Year
Other Revenue or Savings	0.00 £/Year

Remuneration and Savings	
Total Payment from Utility in First Year	32.26 £/Year
First year savings	515.85 £/Year
SEG - Octopus Energy - Outgoing Fixed - SEG eligible	
Validity	08/11/2023 - 07/11/2043
Specific feed-in / export Remuneration	0.055 £/kWh
Feed-in / Export Tariff	32.2552 £/Year
34p/kW (Example)	
Energy Price	0.34 £/kWh
Base Price	4.4712 £/Month
Inflation Rate for Energy Price	6 %/Year

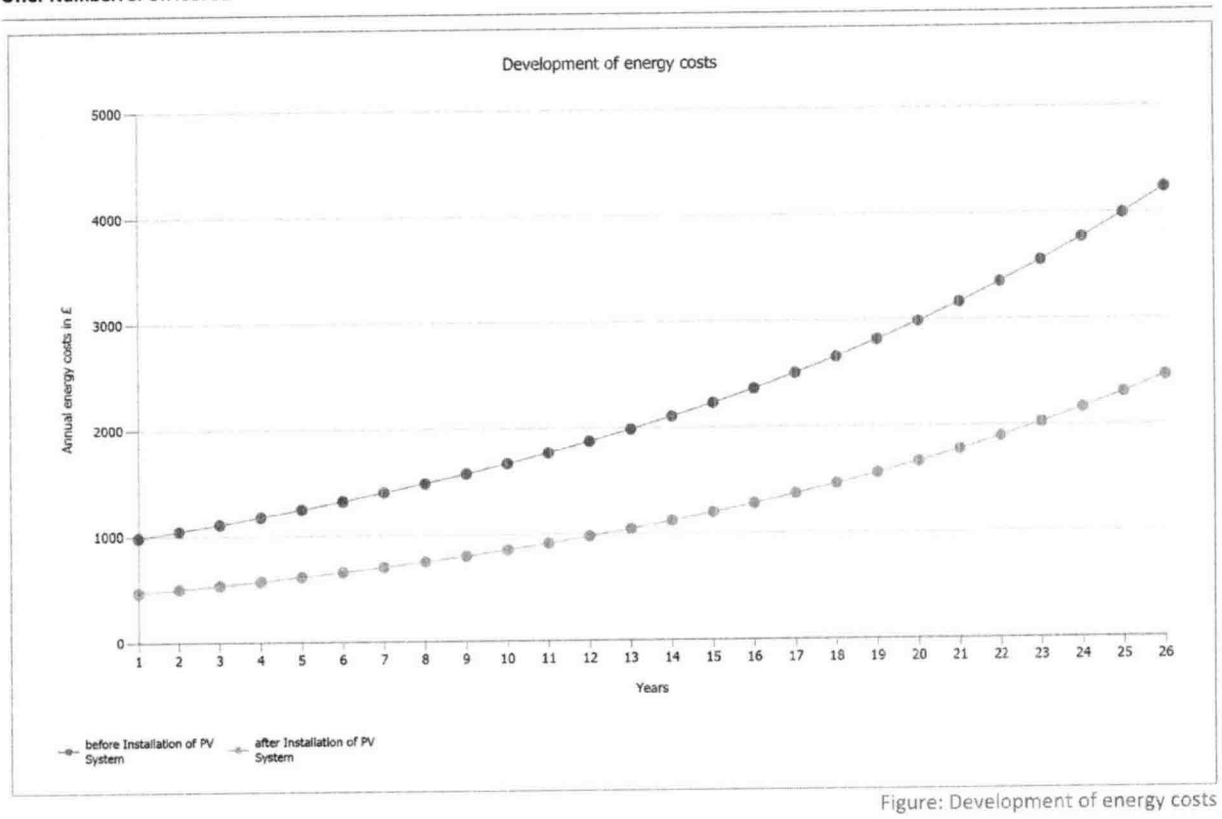


Figure: Development of energy costs

Cash flow

Cash flow

	Year 1	Year 2	Year 3	Year 4	Year 5
Investments	-£5,431.00	£0.00	£0.00	£0.00	£0.00
Feed-in / Export Tariff	£32.19	£32.00	£31.74	£31.48	£31.22
Electricity Savings	£510.33	£542.41	£570.30	£599.58	£630.32
Annual Cash Flow	**-£4,888.48**	**£574.41**	**£602.04**	**£631.06**	**£661.54**
Accrued Cash Flow (Cash Balance)	-£4,888.48	-£4,314.07	-£3,712.04	-£3,080.98	-£2,419.43

Cash flow

	Year 6	Year 7	Year 8	Year 9	Year 10
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Feed-in / Export Tariff	£30.96	£30.70	£30.44	£30.18	£29.92
Electricity Savings	£662.60	£696.48	£732.03	£769.35	£808.51
Annual Cash Flow	**£693.56**	**£727.17**	**£762.47**	**£799.53**	**£838.43**
Accrued Cash Flow (Cash Balance)	-£1,725.88	-£998.70	-£236.23	£563.30	£1,401.72

Cash flow

	Year 11	Year 12	Year 13	Year 14	Year 15
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Feed-in / Export Tariff	£29.66	£29.40	£29.14	£28.88	£28.62
Electricity Savings	£849.60	£892.71	£937.93	£985.36	£1,035.12
Annual Cash Flow	**£879.26**	**£922.11**	**£967.07**	**£1,014.25**	**£1,063.74**
Accrued Cash Flow (Cash Balance)	£2,280.98	£3,203.09	£4,170.16	£5,184.41	£6,248.15

Cash flow

	Year 16	Year 17	Year 18	Year 19	Year 20
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Feed-in / Export Tariff	£28.36	£28.10	£27.84	£27.59	£27.33
Electricity Savings	£1,087.29	£1,142.00	£1,199.36	£1,259.49	£1,322.53
Annual Cash Flow	**£1,115.66**	**£1,170.11**	**£1,227.21**	**£1,287.08**	**£1,349.85**
Accrued Cash Flow (Cash Balance)	£7,363.80	£8,533.91	£9,761.12	£11,048.19	£12,398.05

Cash flow

	Year 21	Year 22	Year 23	Year 24	Year 25
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Feed-in / Export Tariff	£24.61	£24.37	£24.13	£23.90	£23.66
Electricity Savings	£1,388.59	£1,457.81	£1,530.35	£1,606.34	£1,685.94
Annual Cash Flow	**£1,413.19**	**£1,482.18**	**£1,554.48**	**£1,630.24**	**£1,709.60**
Accrued Cash Flow (Cash Balance)	£13,811.24	£15,293.42	£16,847.90	£18,478.13	£20,187.73

Degradation and inflation rates are applied on a monthly basis over the entire observation period. This is done in the first year.

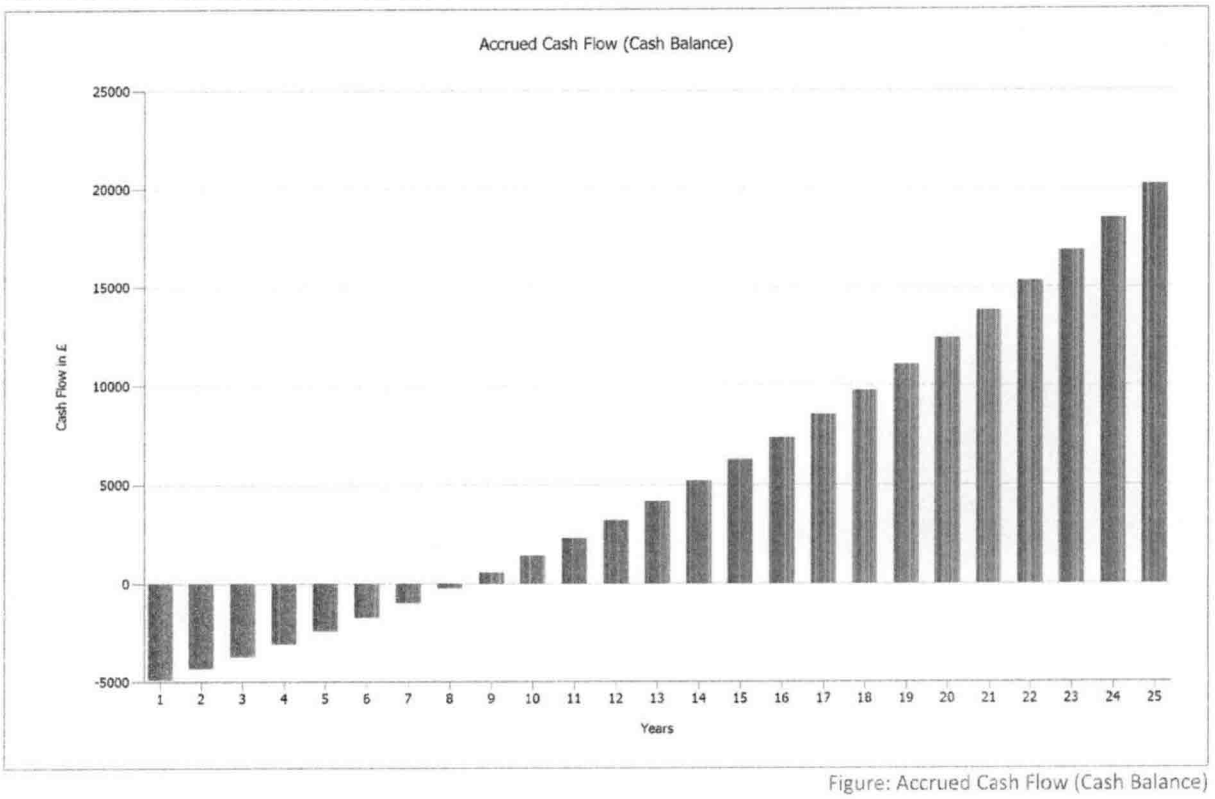


Figure: Accrued Cash Flow (Cash Balance)

Plans and parts list

Circuit Diagram

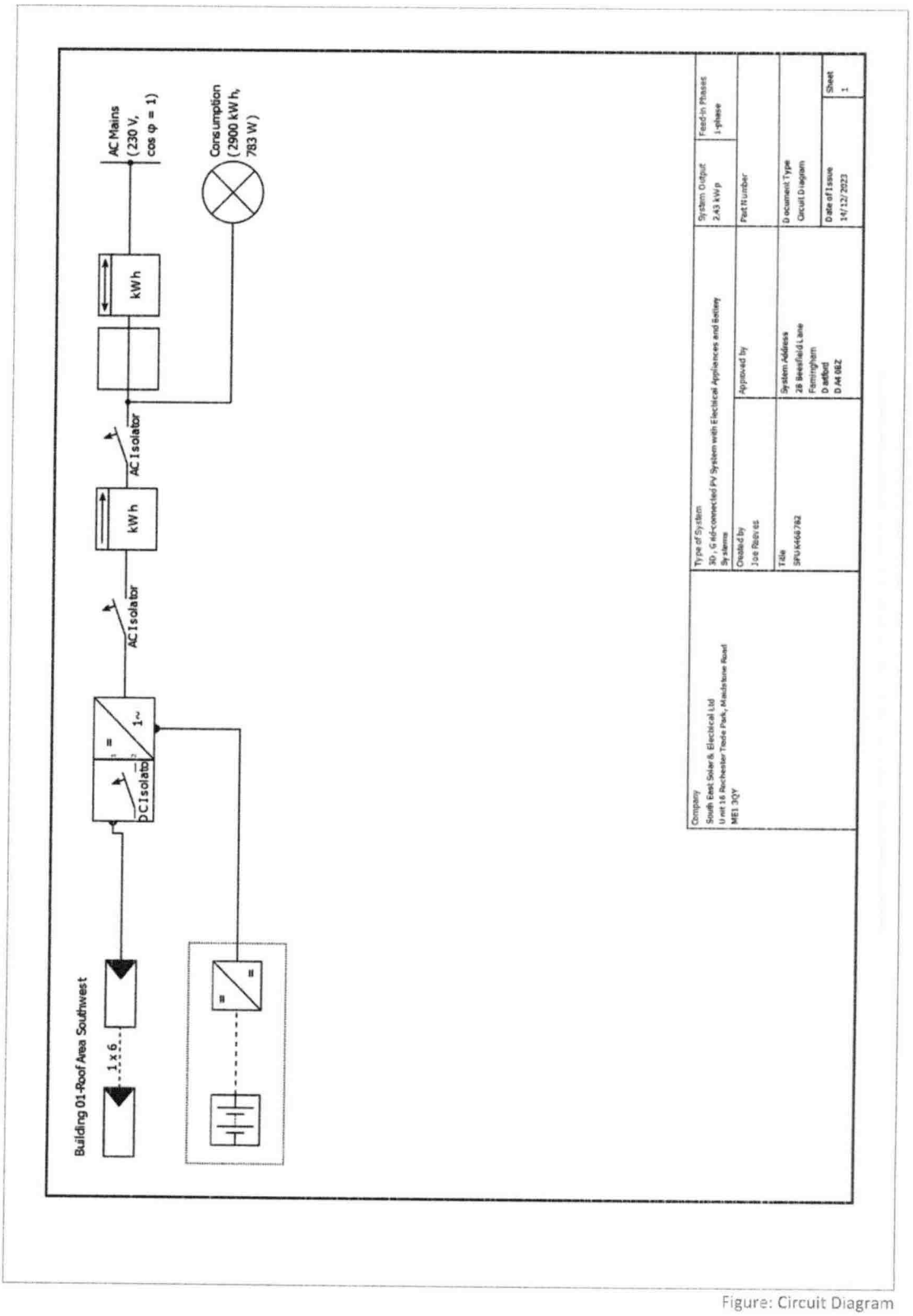


Figure: Circuit Diagram

Overview plan

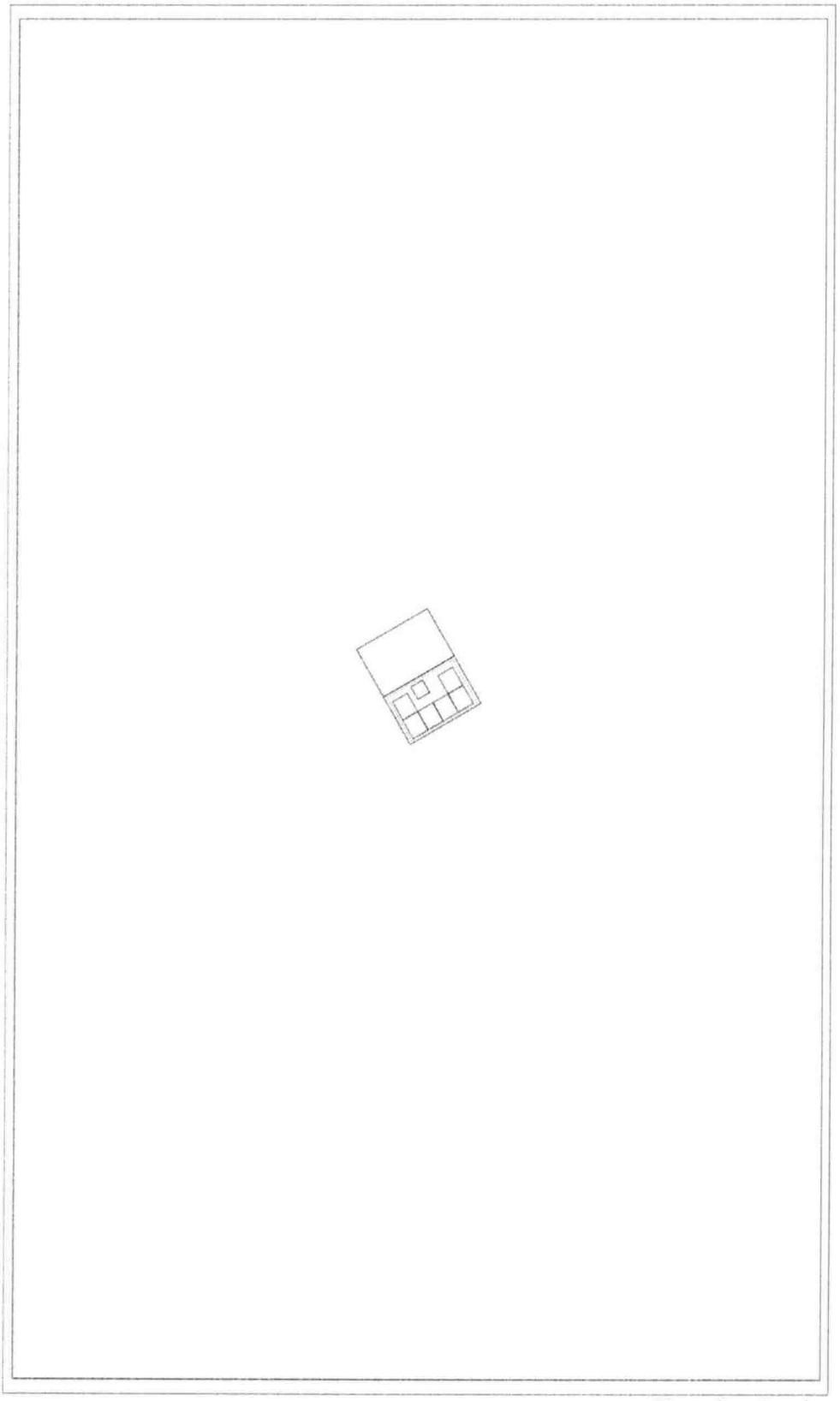


Figure: Overview plan

Dimensioning Plan

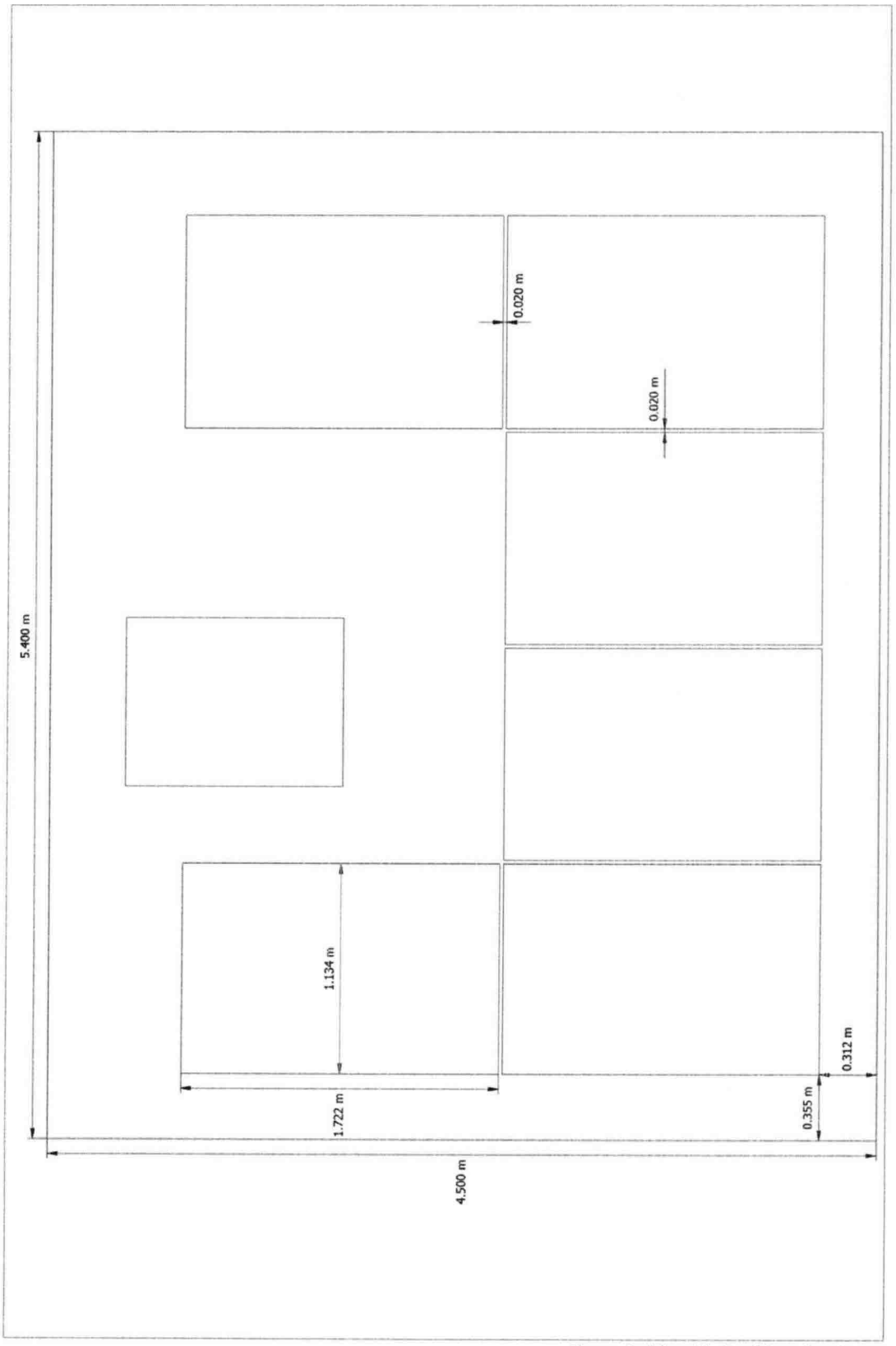


Figure: Building 01 - Roof Area Southwest

String Plan

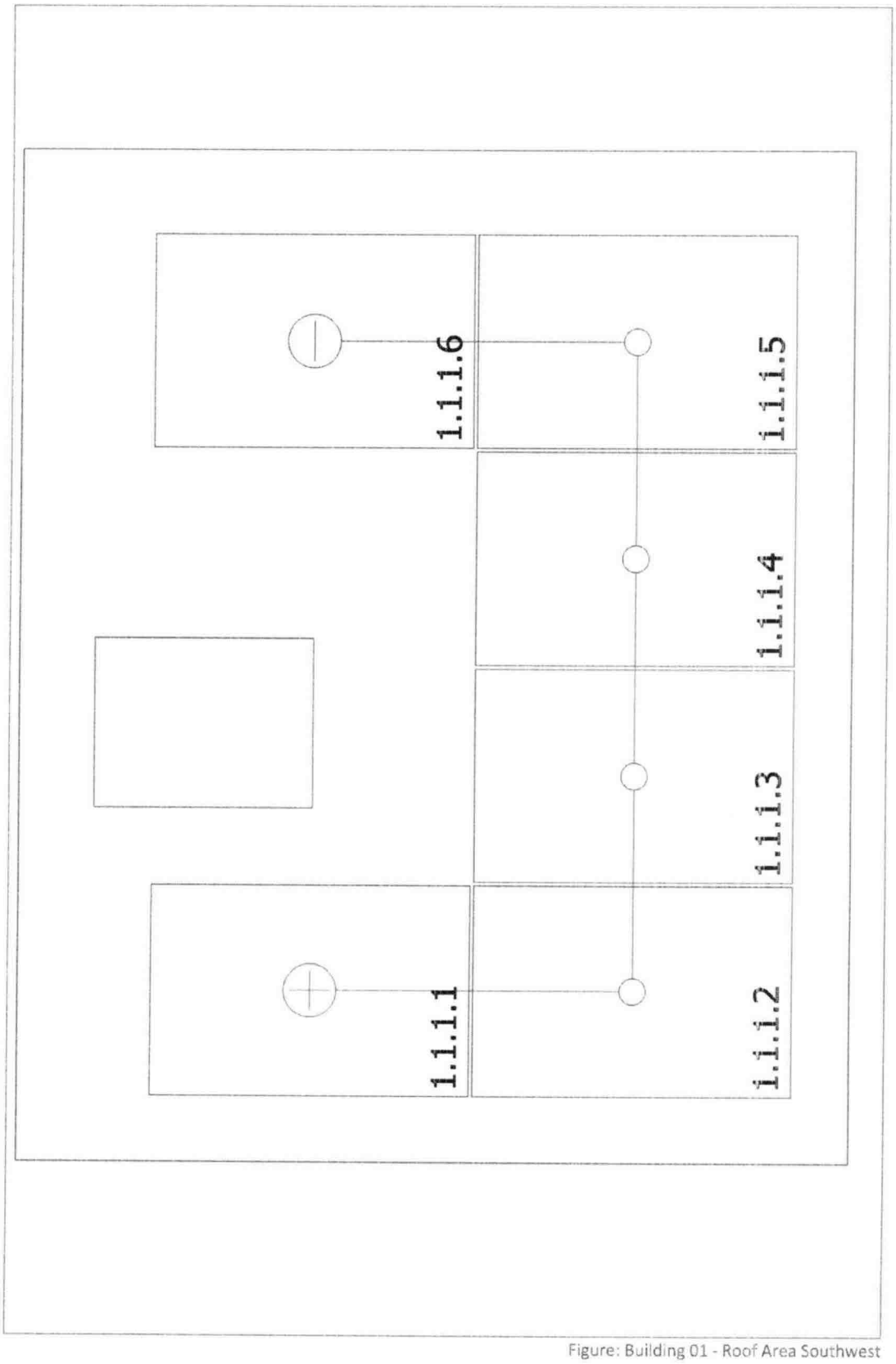


Figure: Building 01 - Roof Area Southwest

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		JA Solar Holdings Co., Ltd.	JAM54S30-405/MR	6	Piece
2	Inverter		Ginlong (Solis)	RHI-3K-48ES-5G	1	Piece
3	Battery System		Ginlong (Solis)	RHI-3K-48ES-5G+US3000C	1	Piece
4	Components			Feed-in Meter	1	Piece
5	Components			Circuit Breaker AC Isolator	2	Piece
6	Components			House connection	1	Piece
7	Components			Bidirectional Meter	1	Piece

Screenshots, 3D Design

Environment

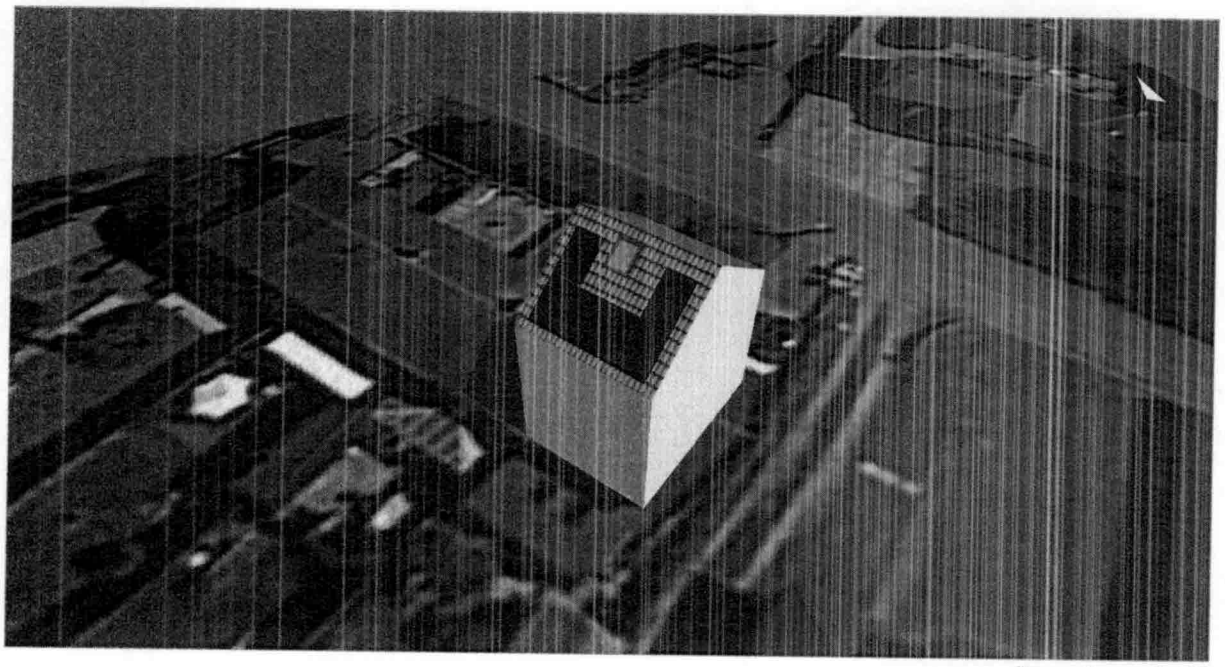


Figure: Screenshot01