



**South East Solar & Electrical Ltd**

Unit 16 Rochester Trade Park, Maidstone Road  
ME1 3QY

John Roy  
172 Elgar Road  
Reading  
RG20BN

**Contact person:**

Niamh Beacroft  
Phone: 01634 553422  
E-Mail: niamh@southeastssolar.co.uk

**Customer No.:** MAN1162

**Project Name:** MAN1162

**Offer no.:** MAN1162

15/03/2024

## Your PV system from South East Solar & Electrical Ltd

### Address of Installation

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172 Elgar Road  
Reading  
RG20BN

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### 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

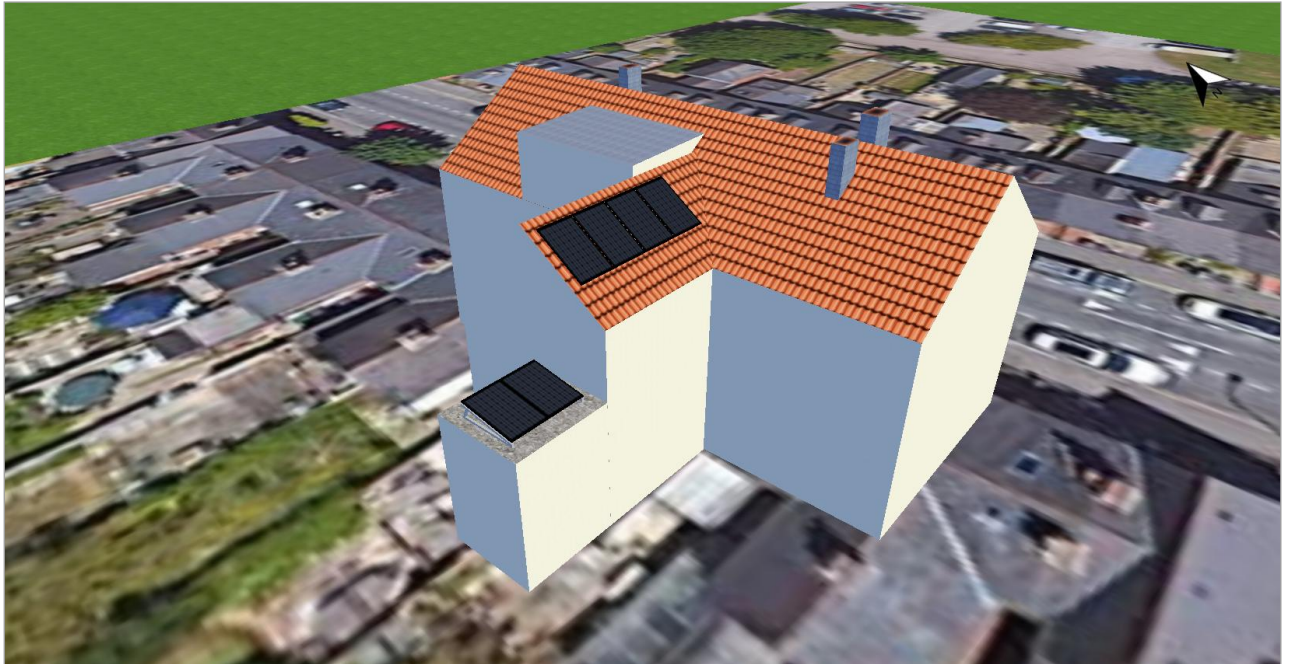


Figure: Overview Image, 3D Design

## PV System

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

|                        |                              |
|------------------------|------------------------------|
| Climate Data           | Bracknell, GBR (2001 - 2020) |
| Values source          | Meteonorm 8.2                |
| PV Generator Output    | 4.8 kWp                      |
| PV Generator Surface   | 23.4 m <sup>2</sup>          |
| Number of PV Modules   | 12                           |
| Number of Inverters    | 1                            |
| No. of battery systems | 1                            |

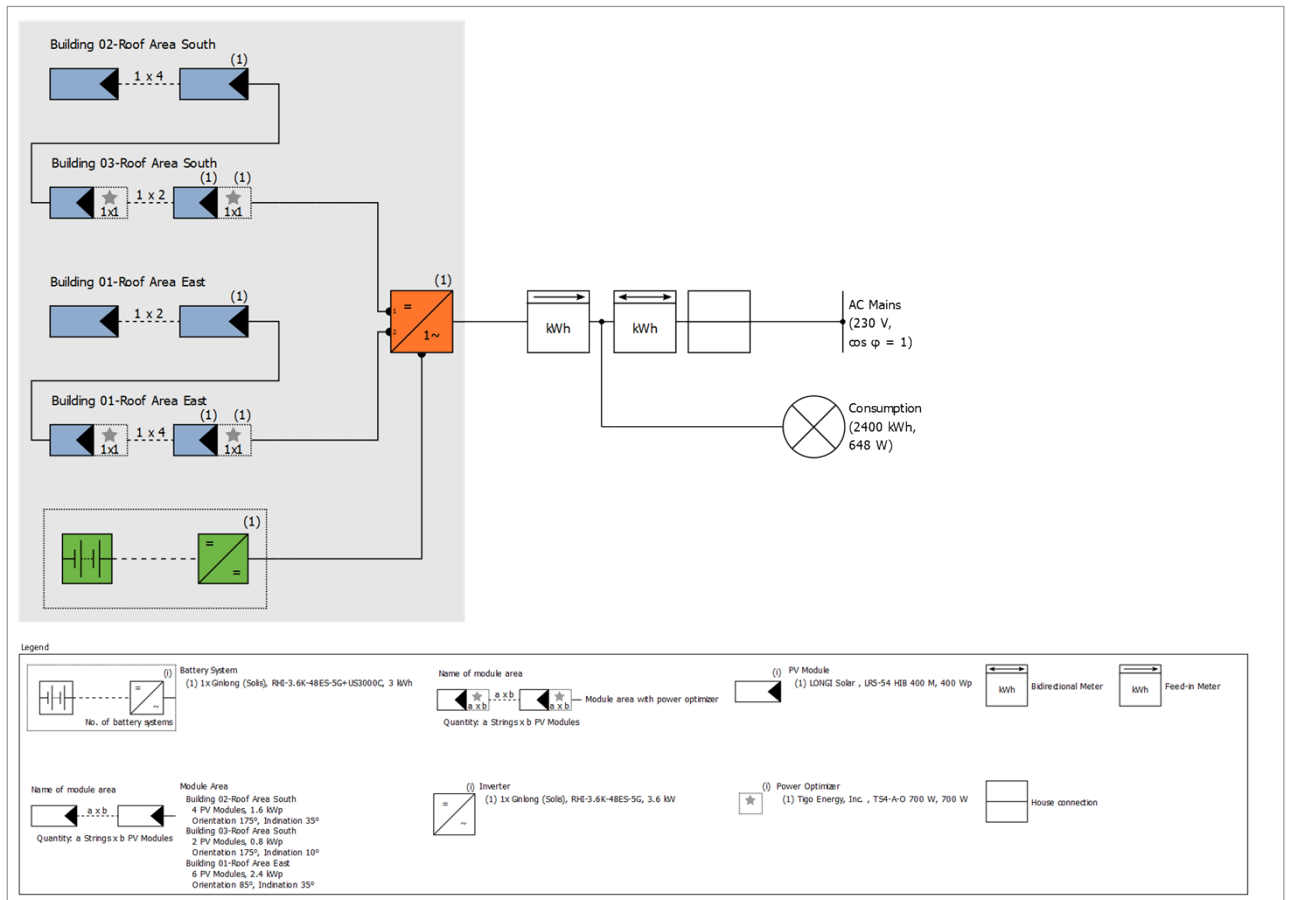


Figure: Schematic diagram

## Production Forecast

### Production Forecast

|                                            |                |
|--------------------------------------------|----------------|
| PV Generator Output                        | 4.80 kWp       |
| Spec. Annual Yield                         | 811.85 kWh/kWp |
| Performance Ratio (PR)                     | 81.71 %        |
| Yield Reduction due to Shading             | 11.0 %         |
| PV Generator Energy (AC grid) with battery | 3,715 kWh/Year |
| Direct Own Use                             | 1,600 kWh/Year |
| Clipping at Feed-in Point                  | 0 kWh/Year     |
| Grid Export                                | 2,115 kWh/Year |
| Own Power Consumption                      | 43.0 %         |
| CO <sub>2</sub> Emissions avoided          | 704 kg / year  |
| Level of Self-sufficiency                  | 66.5 %         |

## Financial Analysis

### Your Gain

|                                |                 |
|--------------------------------|-----------------|
| Total investment costs         | 2,820.00 £      |
| Internal Rate of Return (IRR)  | 28.10 %         |
| Amortization Period            | 4.0 Years       |
| Electricity Production Costs   | 0.0304 £/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 |
|----------------|-----------------------------------------------------------------------------|

### Climate Data

|                                             |                              |
|---------------------------------------------|------------------------------|
| Location                                    | Bracknell, GBR (2001 - 2020) |
| Values source                               | Meteonorm 8.2                |
| Resolution of the data                      | 1 h                          |
| Simulation models used:                     |                              |
| - Diffuse Irradiation onto Horizontal Plane | Hofmann                      |
| - Irradiance onto tilted surface            | Hay & Davies                 |

### Consumption

|                   |          |
|-------------------|----------|
| Total Consumption | 2400 kWh |
| UK Household      | 2400 kWh |
| Load Peak         | 0.6 kW   |

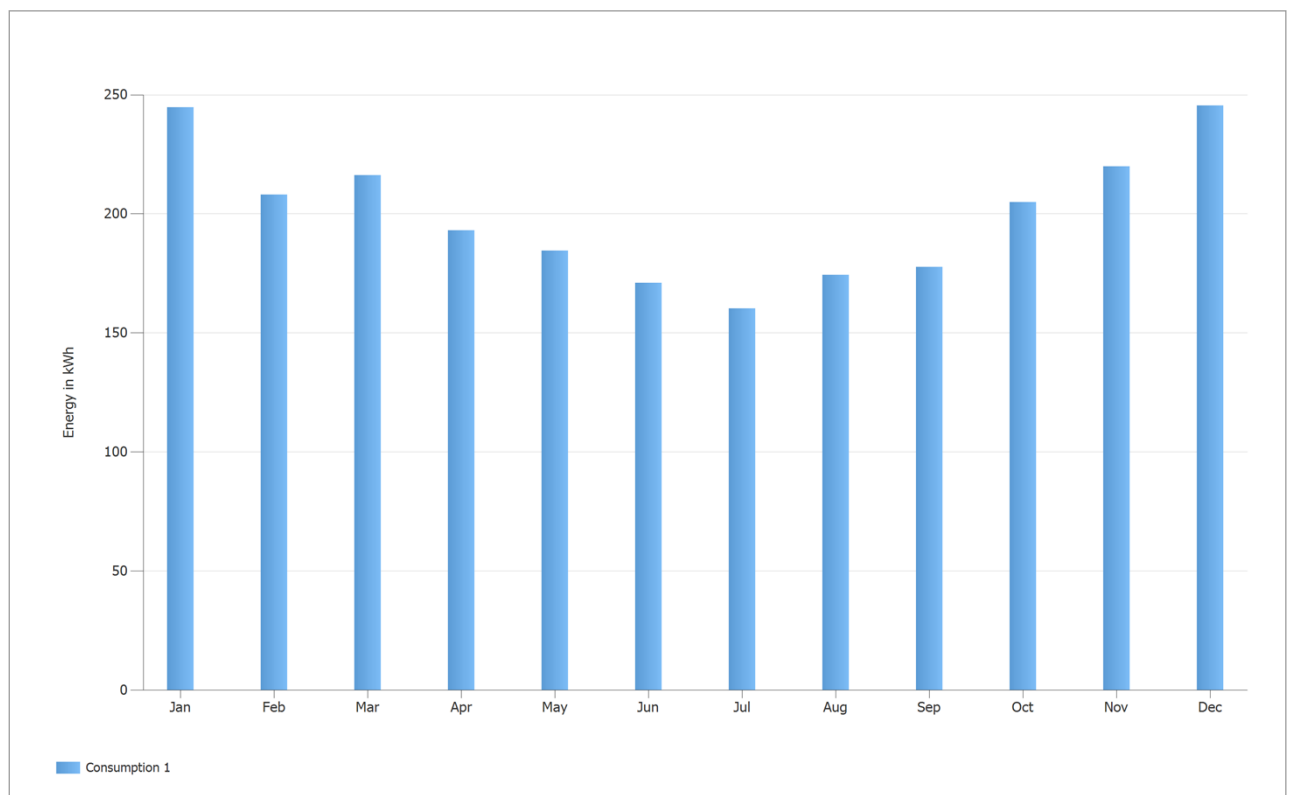


Figure: Consumption

## Module Areas

### 1. Module Area - Building 02-Roof Area South

PV Generator, 1. Module Area - Building 02-Roof Area South

|                      |                             |
|----------------------|-----------------------------|
| Name                 | Building 02-Roof Area South |
| PV Modules           | 4 x LR5-54 HIB 400 M (v1)   |
| Manufacturer         | LONGI Solar                 |
| Inclination          | 35 °                        |
| Orientation          | South 175 °                 |
| Installation Type    | Roof parallel               |
| PV Generator Surface | 7.8 m <sup>2</sup>          |

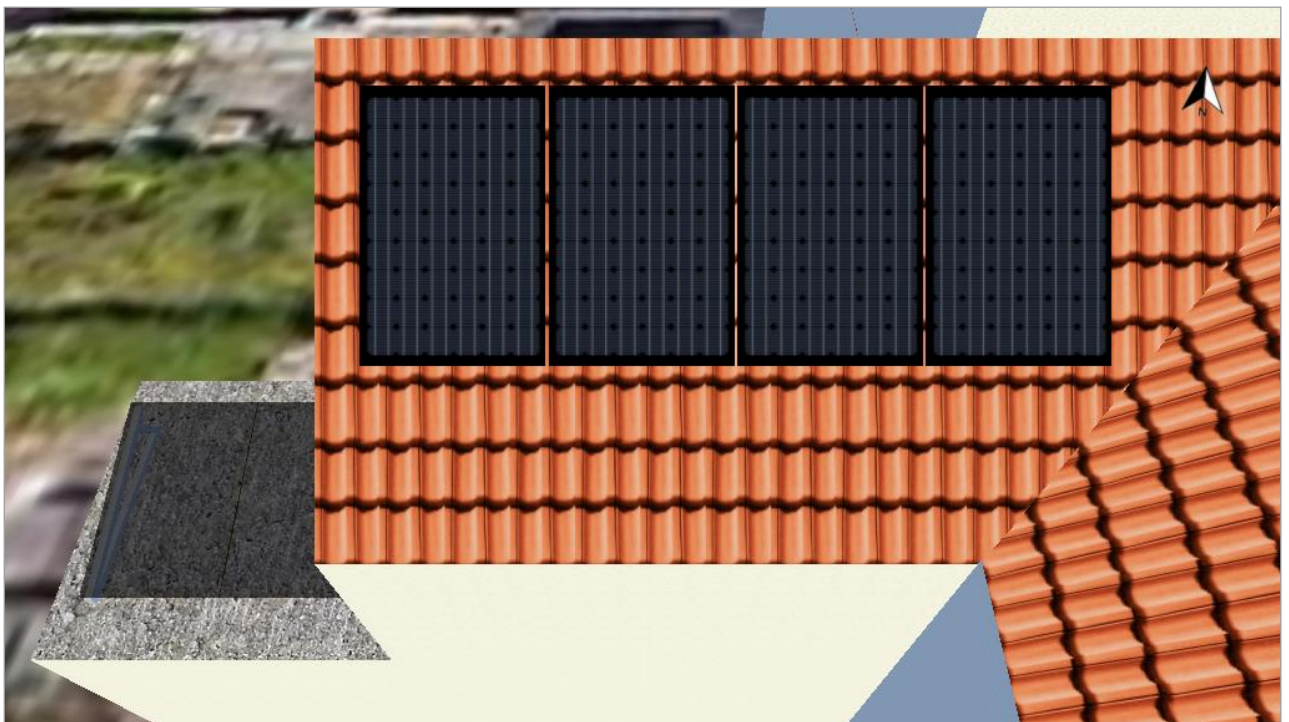


Figure: 1. Module Area - Building 02-Roof Area South

## 2. Module Area - Building 03-Roof Area South

### PV Generator, 2. Module Area - Building 03-Roof Area South

|                      |                             |
|----------------------|-----------------------------|
| Name                 | Building 03-Roof Area South |
| PV Modules           | 2 x LR5-54 HIB 400 M (v1)   |
| Manufacturer         | LONGI Solar                 |
| Inclination          | 10 °                        |
| Orientation          | South 175 °                 |
| Installation Type    | Mounted - Roof              |
| PV Generator Surface | 3.9 m <sup>2</sup>          |

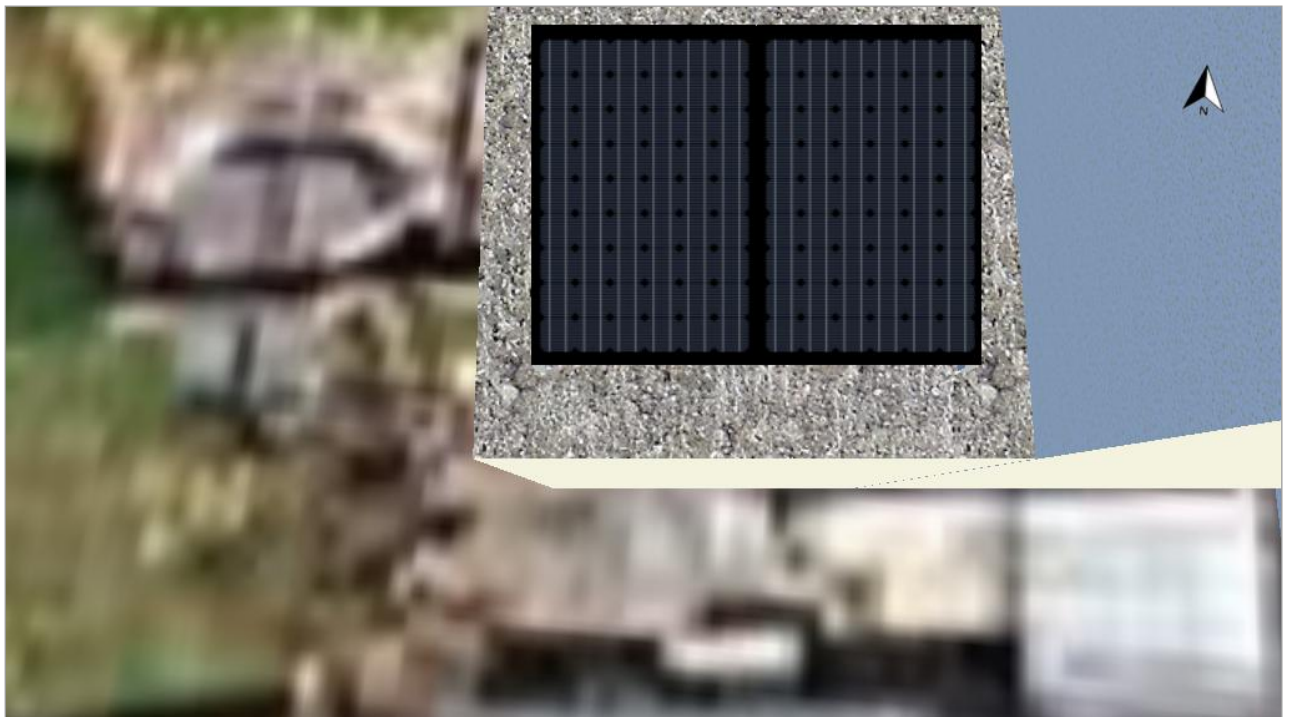


Figure: 2. Module Area - Building 03-Roof Area South

### 3. Module Area - Building 01-Roof Area East

#### PV Generator, 3. Module Area - Building 01-Roof Area East

|                      |                            |
|----------------------|----------------------------|
| Name                 | Building 01-Roof Area East |
| PV Modules           | 6 x LR5-54 HIB 400 M (v1)  |
| Manufacturer         | LONGI Solar                |
| Inclination          | 35 °                       |
| Orientation          | East 85 °                  |
| Installation Type    | Roof parallel              |
| PV Generator Surface | 11.7 m <sup>2</sup>        |

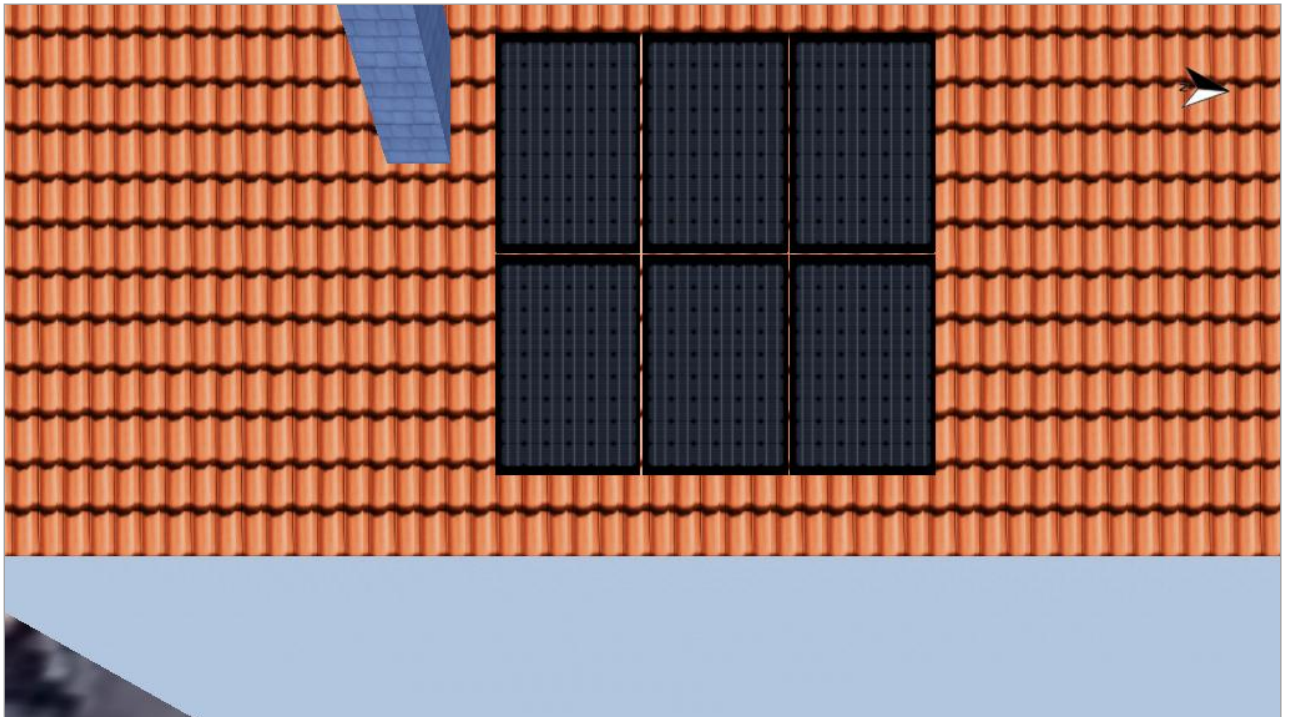


Figure: 3. Module Area - Building 01-Roof Area East

## Horizon Line, 3D Design

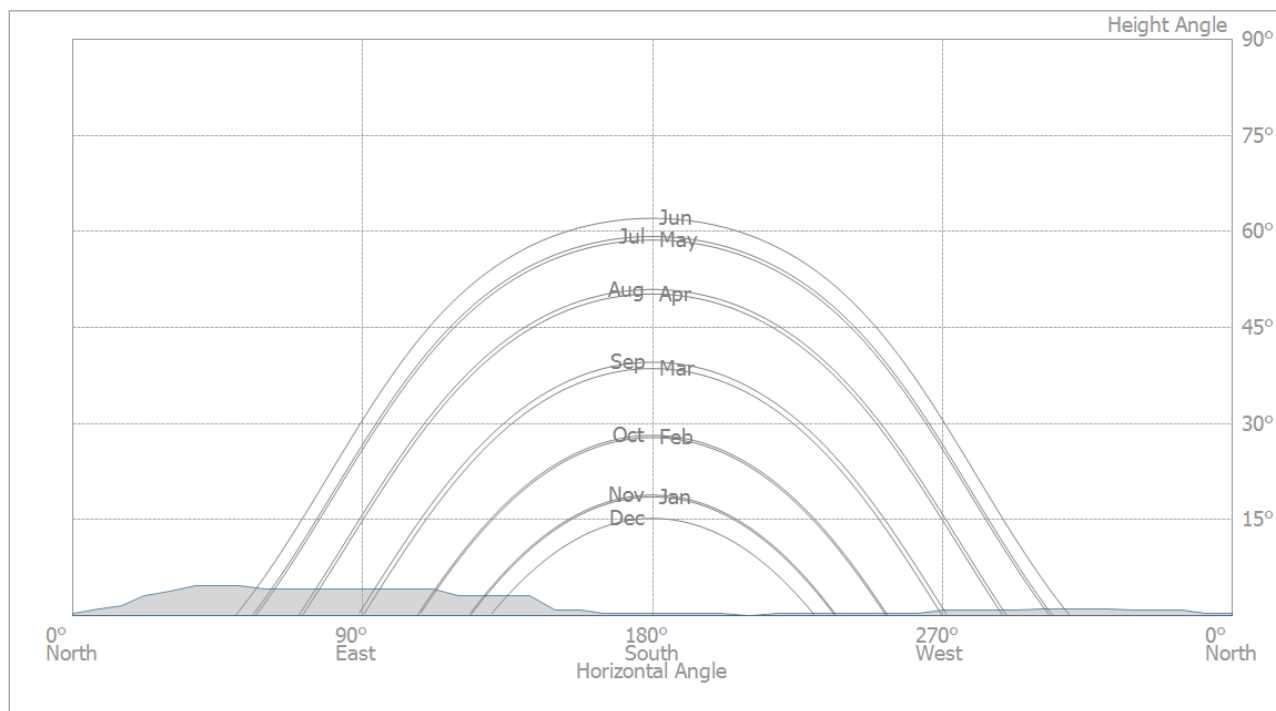


Figure: Horizon (3D Design)

## Inverter configuration

### Configuration 1

|                 |                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------|
| Module Areas    | Building 02-Roof Area South + Building 03-Roof Area South<br>+ Building 01-Roof Area East |
| Inverter 1      |                                                                                           |
| Model           | RHI-3.6K-48ES-5G (v2)                                                                     |
| Manufacturer    | Ginlong (Solis)                                                                           |
| Quantity        | 1                                                                                         |
| Sizing Factor   | 133.3 %                                                                                   |
| Configuration   | MPP 1:<br>1 x 4 + 1 x 2 ☆ [1 x 1]<br>MPP 2:<br>1 x 2 + 1 x 4 ☆ [1 x 1]                    |
| Power Optimizer | 6x Tigo Energy, Inc. , TS4-A-O 700 W (v2)                                                 |

## 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-3.6K-48ES-5G+US3000C (v1)    |
| Manufacturer     | Ginlong (Solis)                  |
| Quantity         | 1                                |
| Battery Inverter |                                  |
| Type of Coupling | DC intermediate circuit coupling |
| Nominal output   | 3.6 kW                           |
| Battery          |                                  |
| Manufacturer     | Pylon Technologies Co., Ltd.     |
| Model            | US3000C (v1)                     |
| Quantity         | 1                                |
| Battery Energy   | 3 kWh                            |
| Battery Type     | Lithium iron phosphate           |

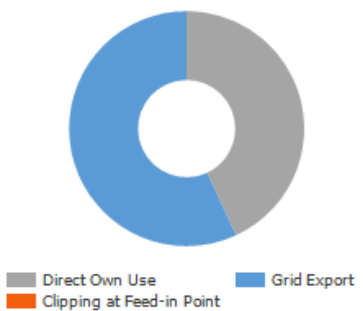
# Simulation Results

## Results Total System

### PV System

|                                            |                |
|--------------------------------------------|----------------|
| PV Generator Output                        | 4.80 kWp       |
| Spec. Annual Yield                         | 811.85 kWh/kWp |
| Performance Ratio (PR)                     | 81.71 %        |
| Yield Reduction due to Shading             | 11.0 %         |
| PV Generator Energy (AC grid) with battery | 3,715 kWh/Year |
| Direct Own Use                             | 1,600 kWh/Year |
| Clipping at Feed-in Point                  | 0 kWh/Year     |
| Grid Export                                | 2,115 kWh/Year |
| Own Power Consumption                      | 43.0 %         |
| CO <sub>2</sub> Emissions avoided          | 704 kg / year  |

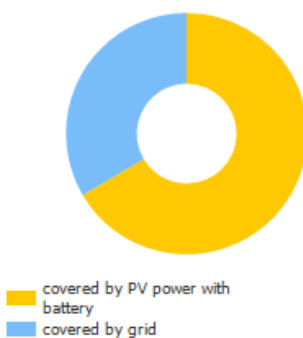
PV Generator Energy (AC grid) with battery



### Appliances

|                                  |                |
|----------------------------------|----------------|
| Appliances                       | 2,400 kWh/Year |
| Standby Consumption (Inverter)   | 5 kWh/Year     |
| Total Consumption                | 2,405 kWh/Year |
| covered by PV power with battery | 1,600 kWh/Year |
| covered by grid                  | 806 kWh/Year   |
| Solar Fraction                   | 66.5 %         |

Total Consumption



### Battery System

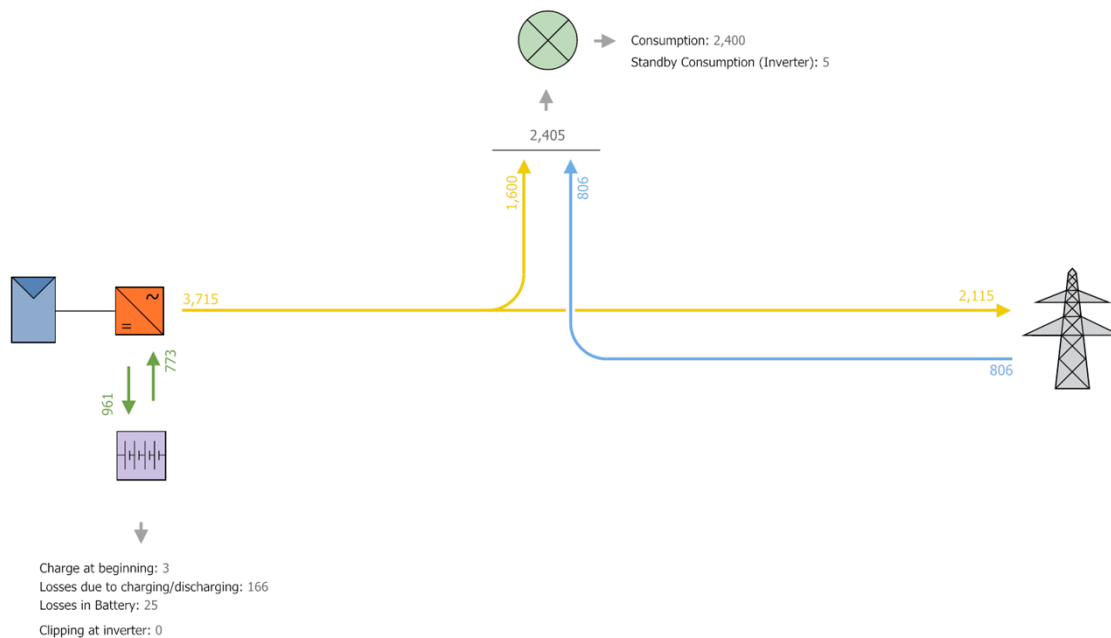
|                                                |              |
|------------------------------------------------|--------------|
| Charge at beginning                            | 3 kWh        |
| Battery Charge (PV System)                     | 961 kWh/Year |
| Battery Energy for the Covering of Consumption | 773 kWh/Year |
| Battery discharge into the grid                | 0 kWh/Year   |
| Losses due to charging/discharging             | 166 kWh/Year |
| Losses in Battery                              | 25 kWh/Year  |
| Cycle Load                                     | 5.9 %        |
| Service Life                                   | 17 Years     |

### Level of Self-sufficiency

|                           |                |
|---------------------------|----------------|
| Total Consumption         | 2,405 kWh/Year |
| covered by grid           | 806 kWh/Year   |
| Level of Self-sufficiency | 66.5 %         |

## Energy Flow Graph

Project: MAN1162



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

Figure: Energy flow

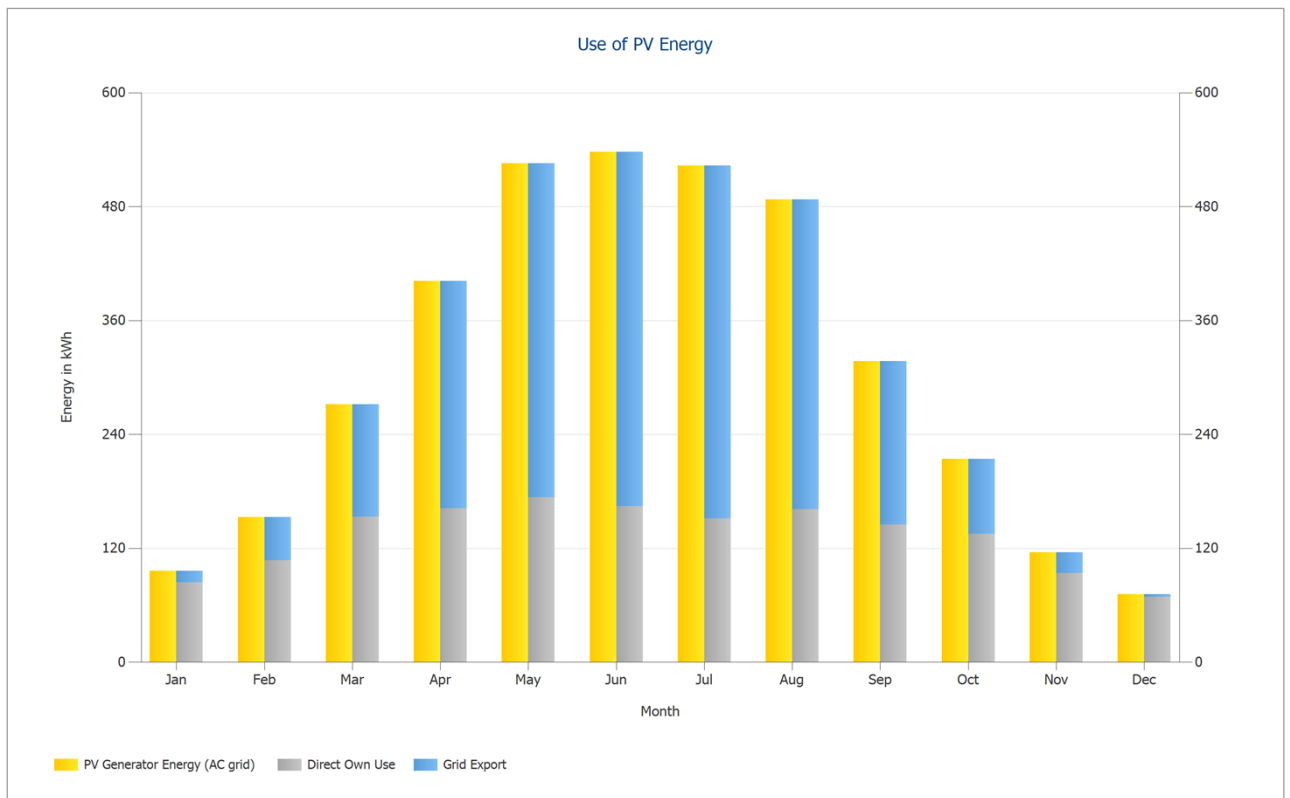


Figure: Use of PV Energy

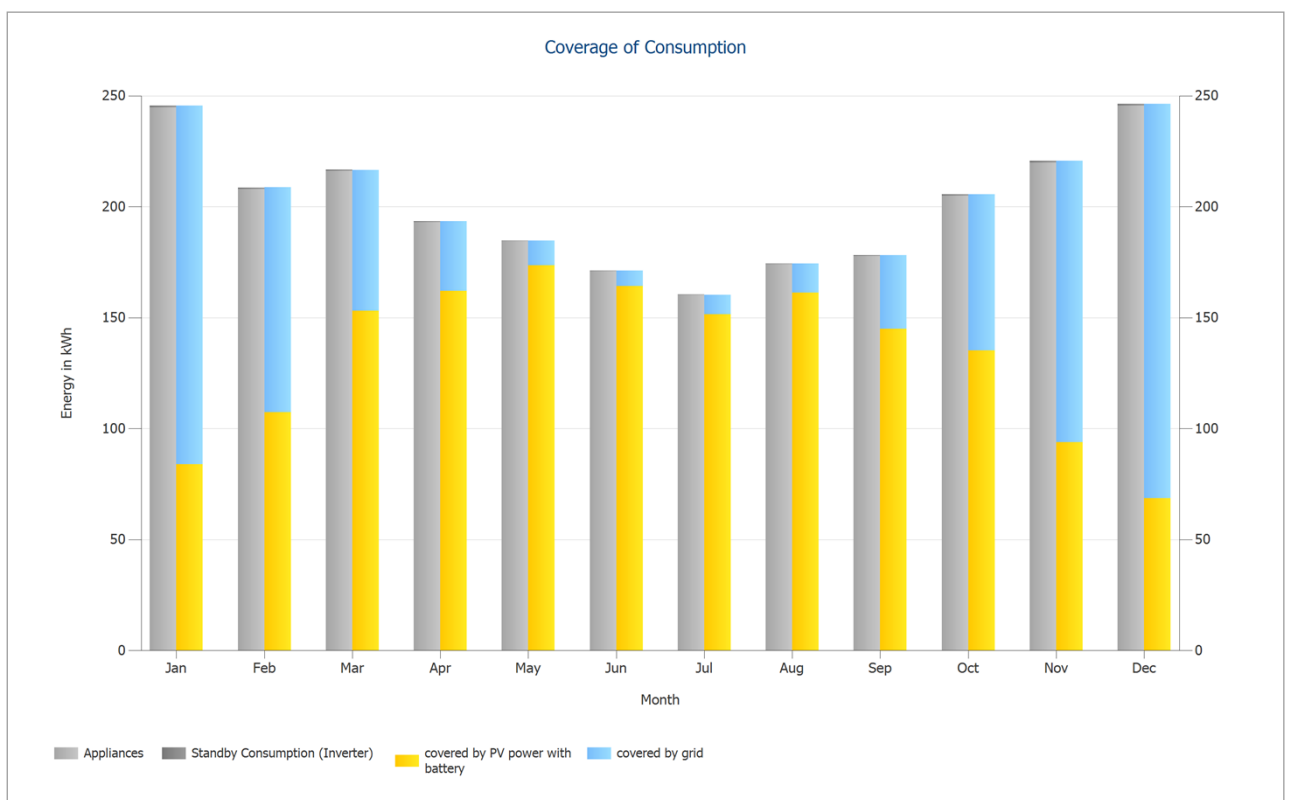


Figure: Coverage of Consumption

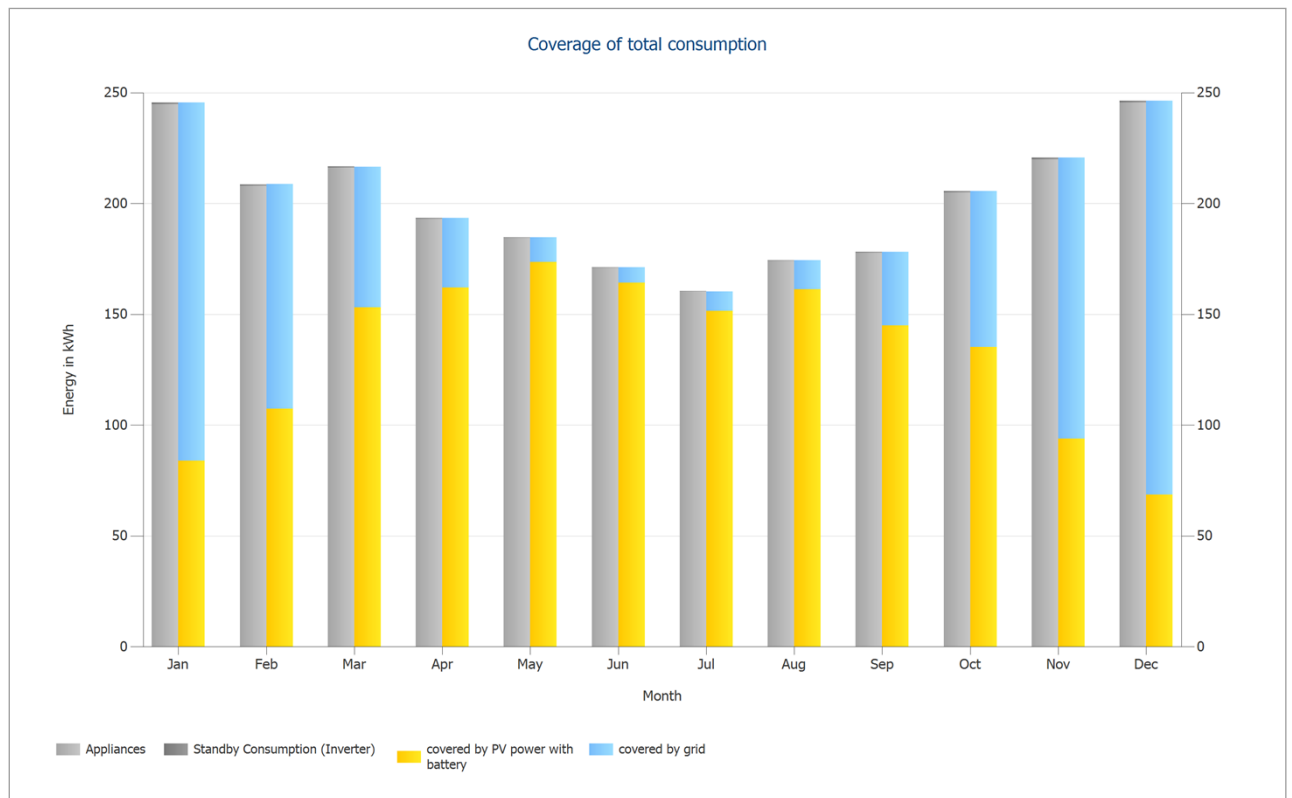


Figure: Coverage of total consumption

# Financial Analysis

## Overview

### System Data

|                                                          |                |
|----------------------------------------------------------|----------------|
| Grid Export in the first year (incl. module degradation) | 2,115 kWh/Year |
| PV Generator Output                                      | 4.8 kWp        |
| Start of Operation of the System                         | 11/05/2023     |
| Assessment Period                                        | 25 Years       |
| Interest on Capital                                      | 0 %            |

### Economic Parameters

|                                  |              |
|----------------------------------|--------------|
| Internal Rate of Return (IRR)    | 28.10 %      |
| Accrued Cash Flow (Cash Balance) | 29,728.16 £  |
| Amortization Period              | 4.0 Years    |
| Electricity Production Costs     | 0.0304 £/kWh |

### Payment Overview

|                           |              |
|---------------------------|--------------|
| Specific Investment Costs | 587.50 £/kWp |
| Investment Costs          | 2,820.00 £   |
| 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 | 116.33 £/Year |
| First year savings                       | 542.10 £/Year |

### SEG - Octopus Energy - Outgoing Fixed - SEG eligible

|                                        |                         |
|----------------------------------------|-------------------------|
| Validity                               | 01/01/2020 - 31/12/2039 |
| Specific feed-in / export Remuneration | 0.055 £/kWh             |
| Feed-in / Export Tariff                | 116.3288 £/Year         |

### 34p/kW (Example)

|                                 |                |
|---------------------------------|----------------|
| Energy Price                    | 0.34 £/kWh     |
| Base Price                      | 4.4712 £/Month |
| Inflation Rate for Energy Price | 6 %/Year       |

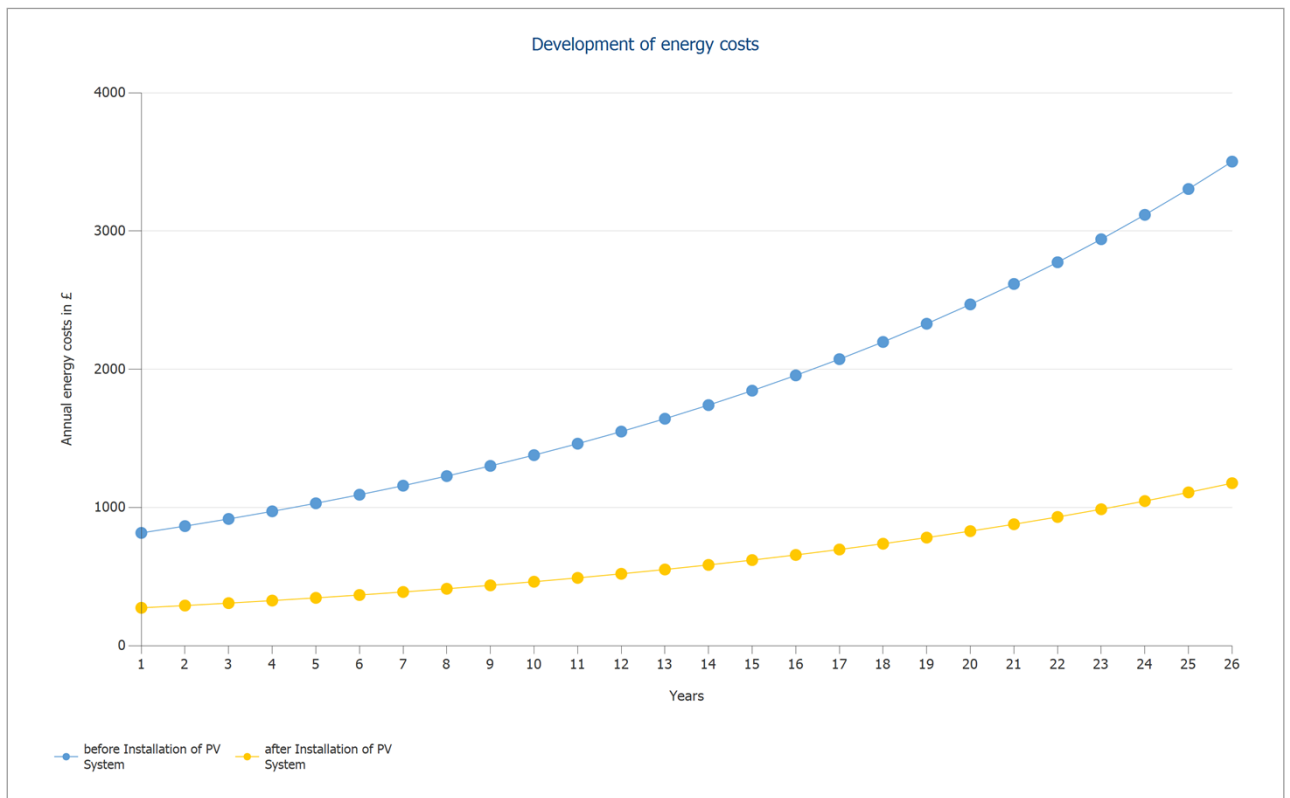


Figure: Development of energy costs

## Cash flow

### Cash flow

|                                  | Year 1            | Year 2         | Year 3         | Year 4         | Year 5         |
|----------------------------------|-------------------|----------------|----------------|----------------|----------------|
| Investments                      | -£2,820.00        | £0.00          | £0.00          | £0.00          | £0.00          |
| Feed-in / Export Tariff          | £110.08           | £116.33        | £116.33        | £116.33        | £116.33        |
| Electricity Savings              | £532.98           | £574.62        | £609.10        | £645.65        | £684.39        |
| <b>Annual Cash Flow</b>          | <b>-£2,176.94</b> | <b>£690.95</b> | <b>£725.43</b> | <b>£761.98</b> | <b>£800.72</b> |
| Accrued Cash Flow (Cash Balance) | -£2,176.94        | -£1,485.99     | -£760.56       | £1.42          | £802.13        |

### 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          | £116.33        | £116.33        | £116.33        | £116.33        | £116.33          |
| Electricity Savings              | £725.45        | £768.98        | £815.12        | £864.02        | £915.86          |
| <b>Annual Cash Flow</b>          | <b>£841.78</b> | <b>£885.31</b> | <b>£931.44</b> | <b>£980.35</b> | <b>£1,032.19</b> |
| Accrued Cash Flow (Cash Balance) | £1,643.91      | £2,529.22      | £3,460.66      | £4,441.02      | £5,473.21        |

### 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          | £116.33          | £116.33          | £116.33          | £116.33          | £116.33          |
| Electricity Savings              | £970.82          | £1,029.07        | £1,090.81        | £1,156.26        | £1,225.63        |
| <b>Annual Cash Flow</b>          | <b>£1,087.15</b> | <b>£1,145.39</b> | <b>£1,207.14</b> | <b>£1,272.59</b> | <b>£1,341.96</b> |
| Accrued Cash Flow (Cash Balance) | £6,560.35        | £7,705.75        | £8,912.89        | £10,185.47       | £11,527.44       |

### 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          | £116.33          | £114.25          | £105.75          | £105.75          | £105.75          |
| Electricity Savings              | £1,299.17        | £1,377.12        | £1,459.75        | £1,547.33        | £1,640.17        |
| <b>Annual Cash Flow</b>          | <b>£1,415.50</b> | <b>£1,491.37</b> | <b>£1,565.50</b> | <b>£1,653.09</b> | <b>£1,745.93</b> |
| Accrued Cash Flow (Cash Balance) | £12,942.94       | £14,434.31       | £15,999.81       | £17,652.90       | £19,398.83       |

### 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          | £105.75          | £105.75          | £105.75          | £105.75          | £105.75          |
| Electricity Savings              | £1,738.58        | £1,842.90        | £1,953.47        | £2,070.68        | £2,194.92        |
| <b>Annual Cash Flow</b>          | <b>£1,844.34</b> | <b>£1,948.65</b> | <b>£2,059.23</b> | <b>£2,176.44</b> | <b>£2,300.68</b> |
| Accrued Cash Flow (Cash Balance) | £21,243.16       | £23,191.82       | £25,251.04       | £27,427.48       | £29,728.16       |

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

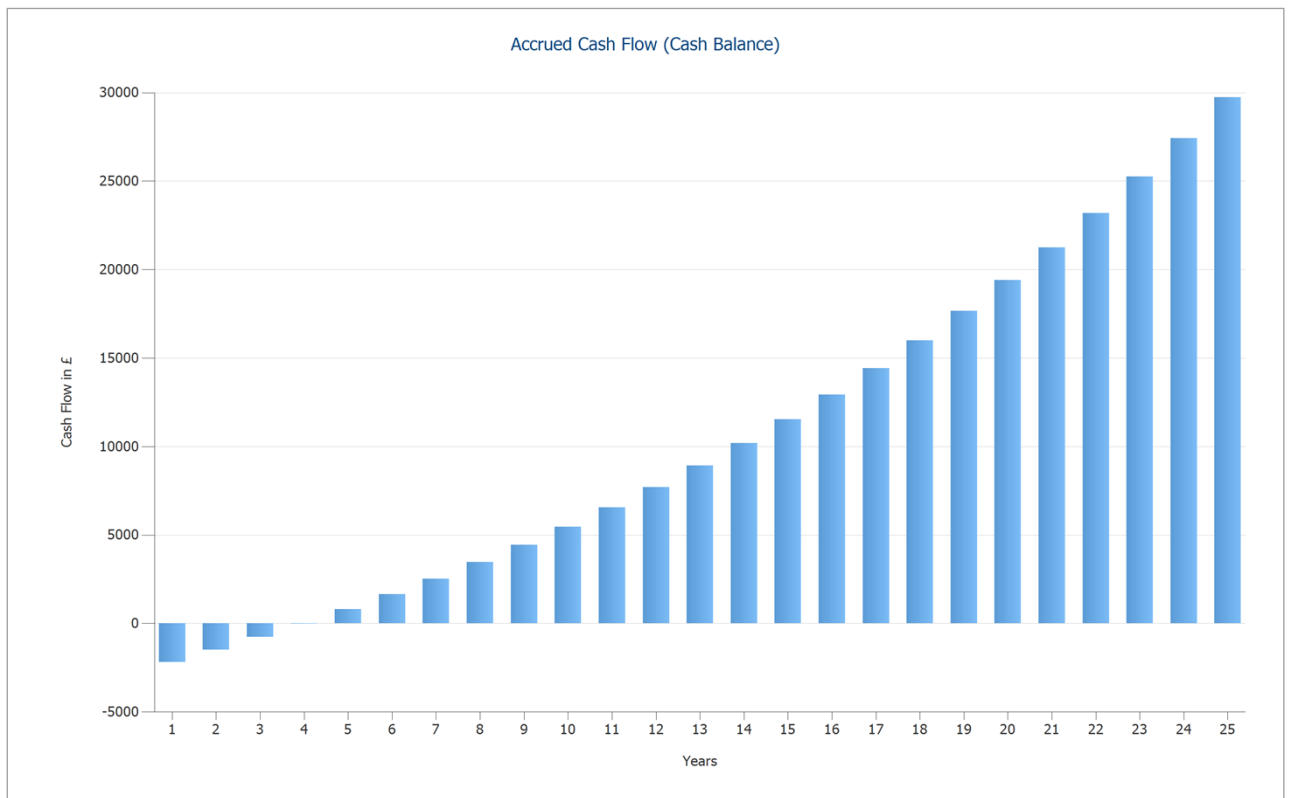


Figure: Accrued Cash Flow (Cash Balance)

Plans and parts list

Circuit Diagram

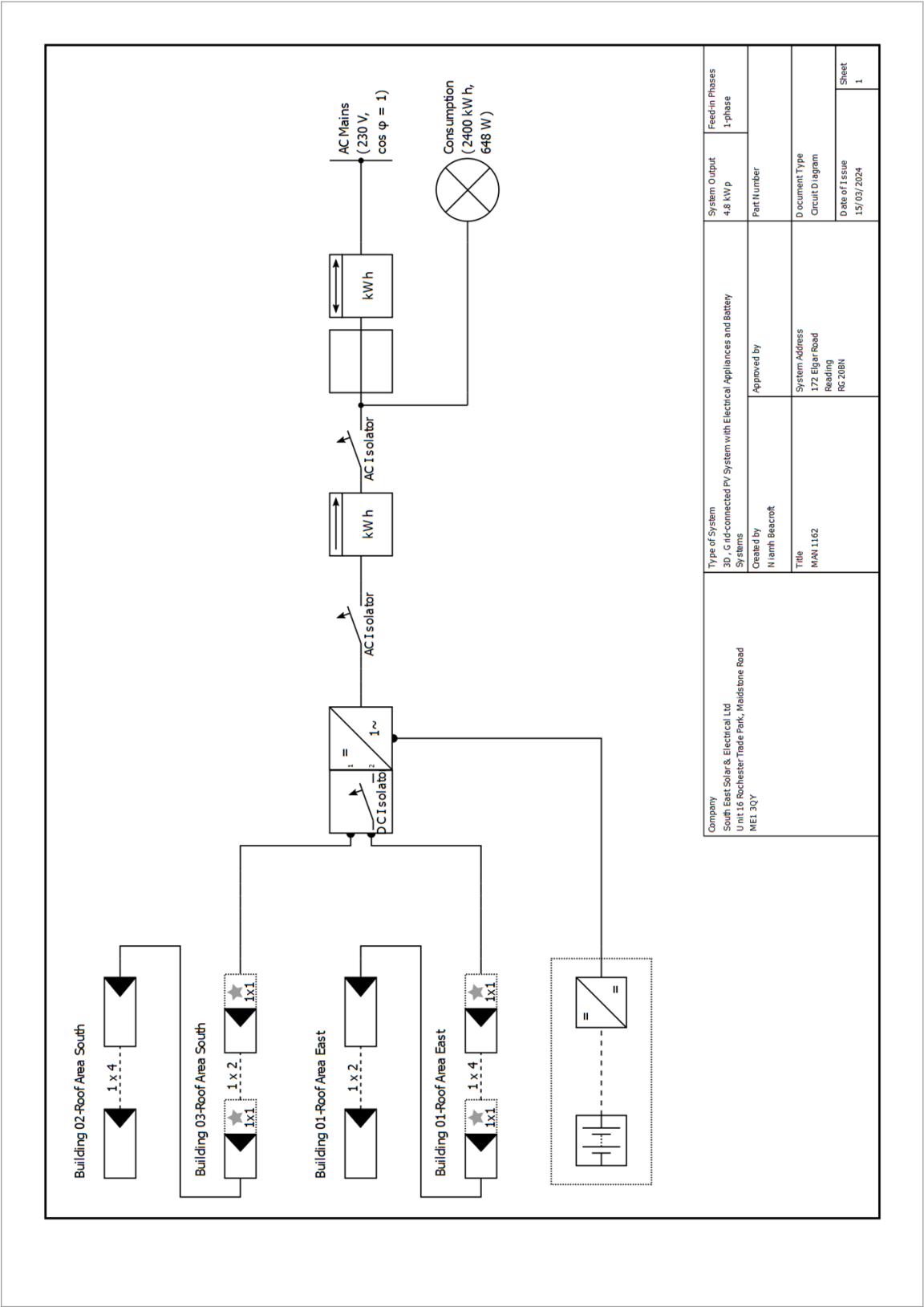


Figure: Circuit Diagram

## Overview plan

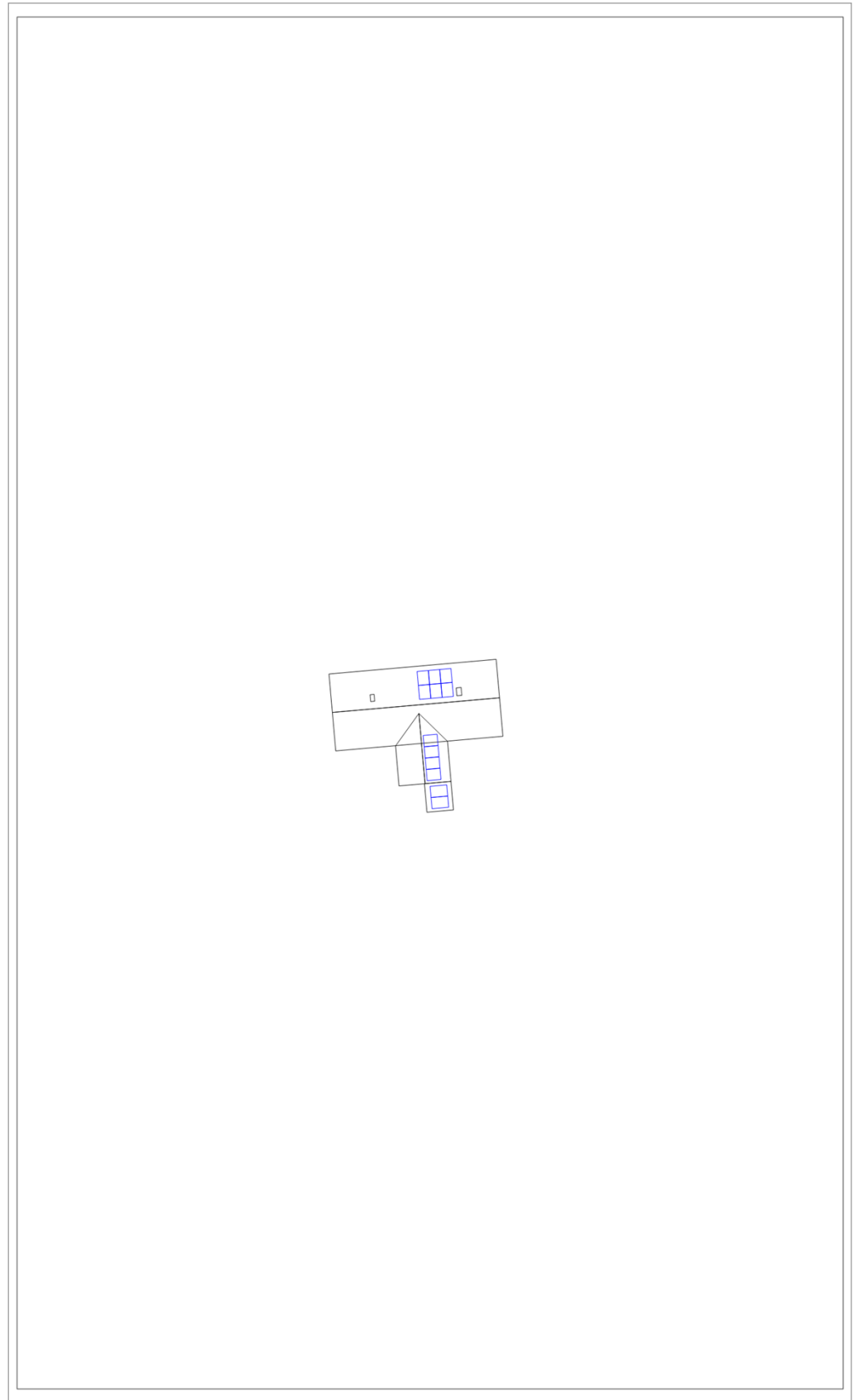


Figure: Overview plan

## Dimensioning Plan

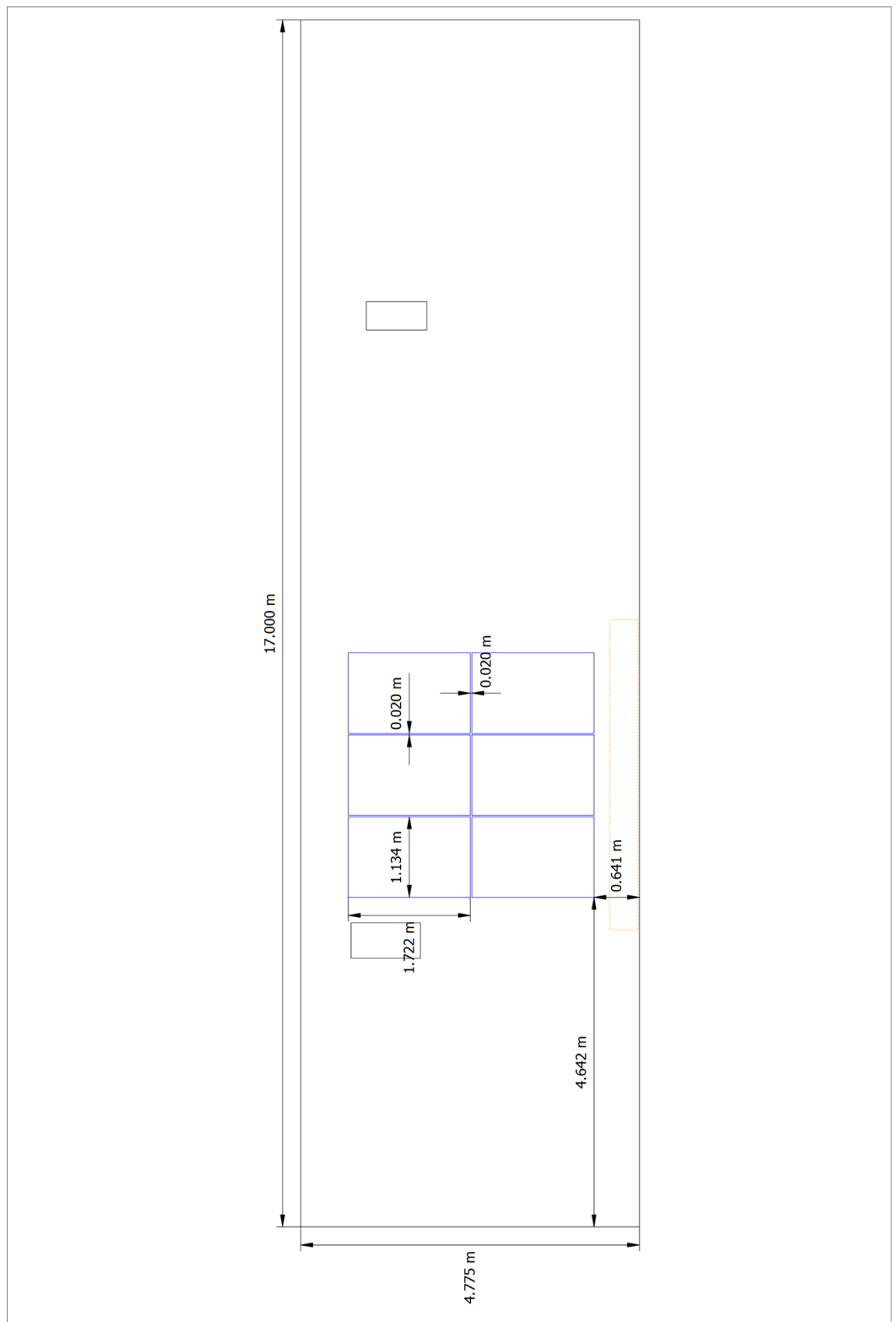


Figure: Building 01 - Roof Area East

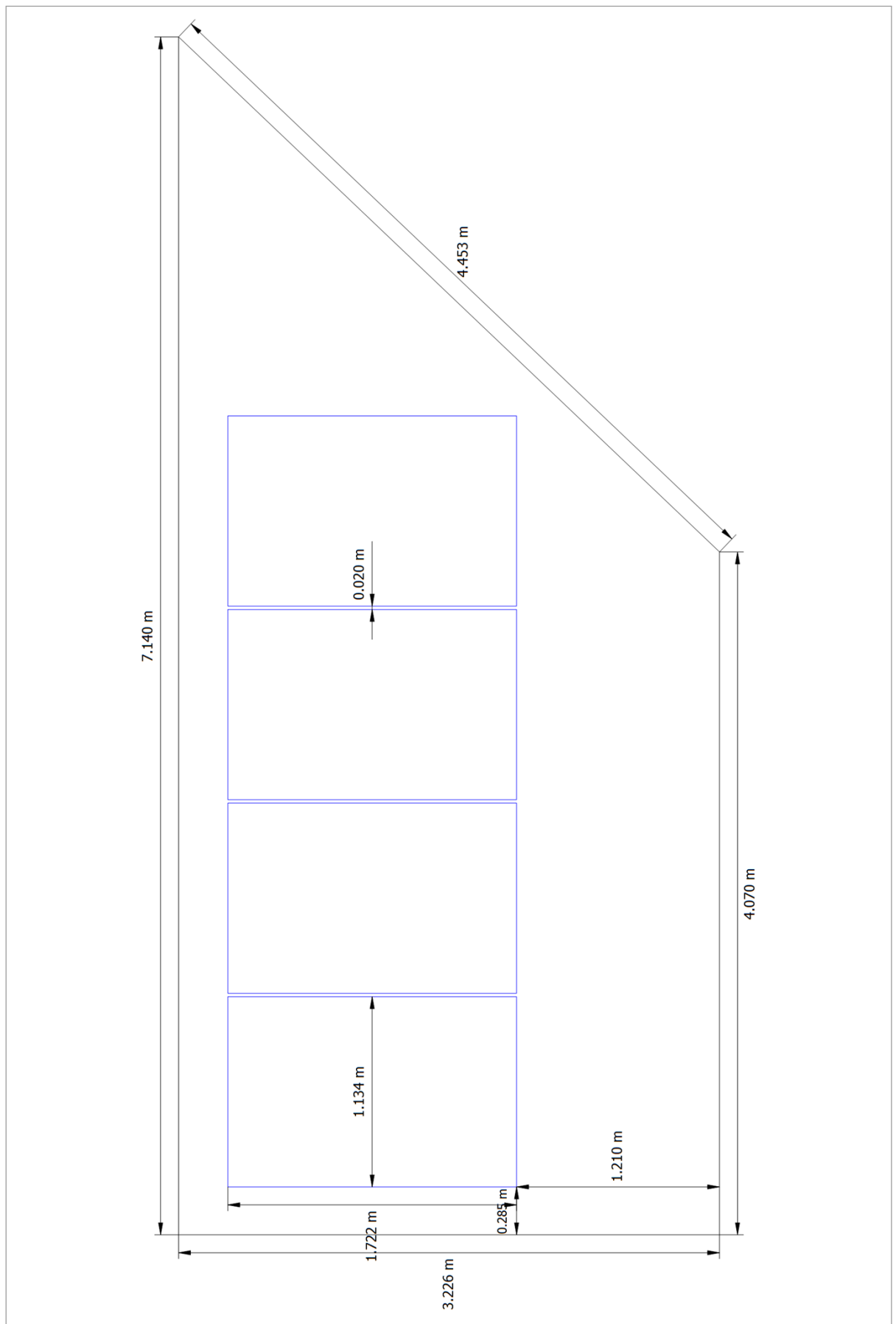


Figure: Building 02 - Roof Area South

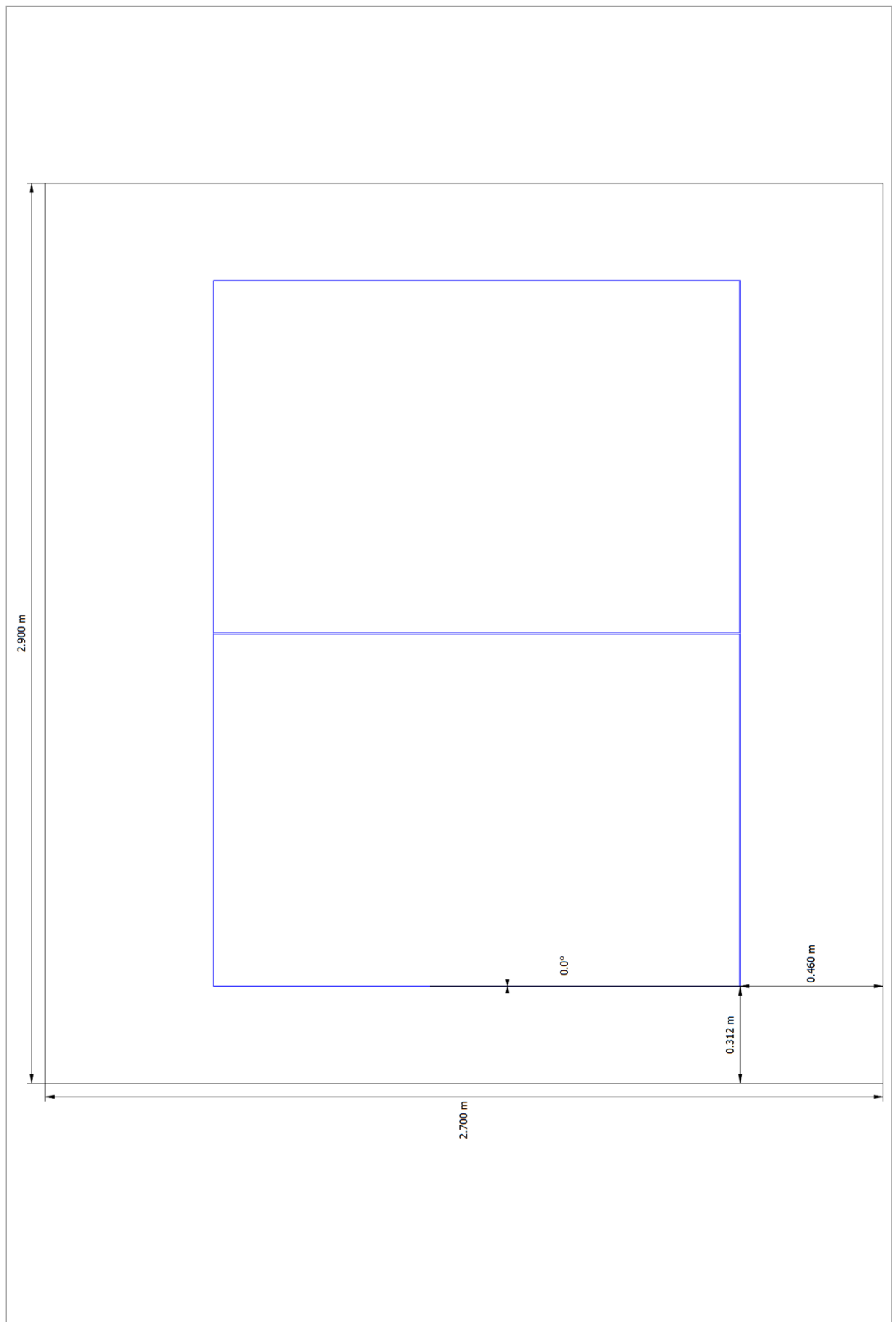


Figure: Building 03 - Roof Area South

## String Plan

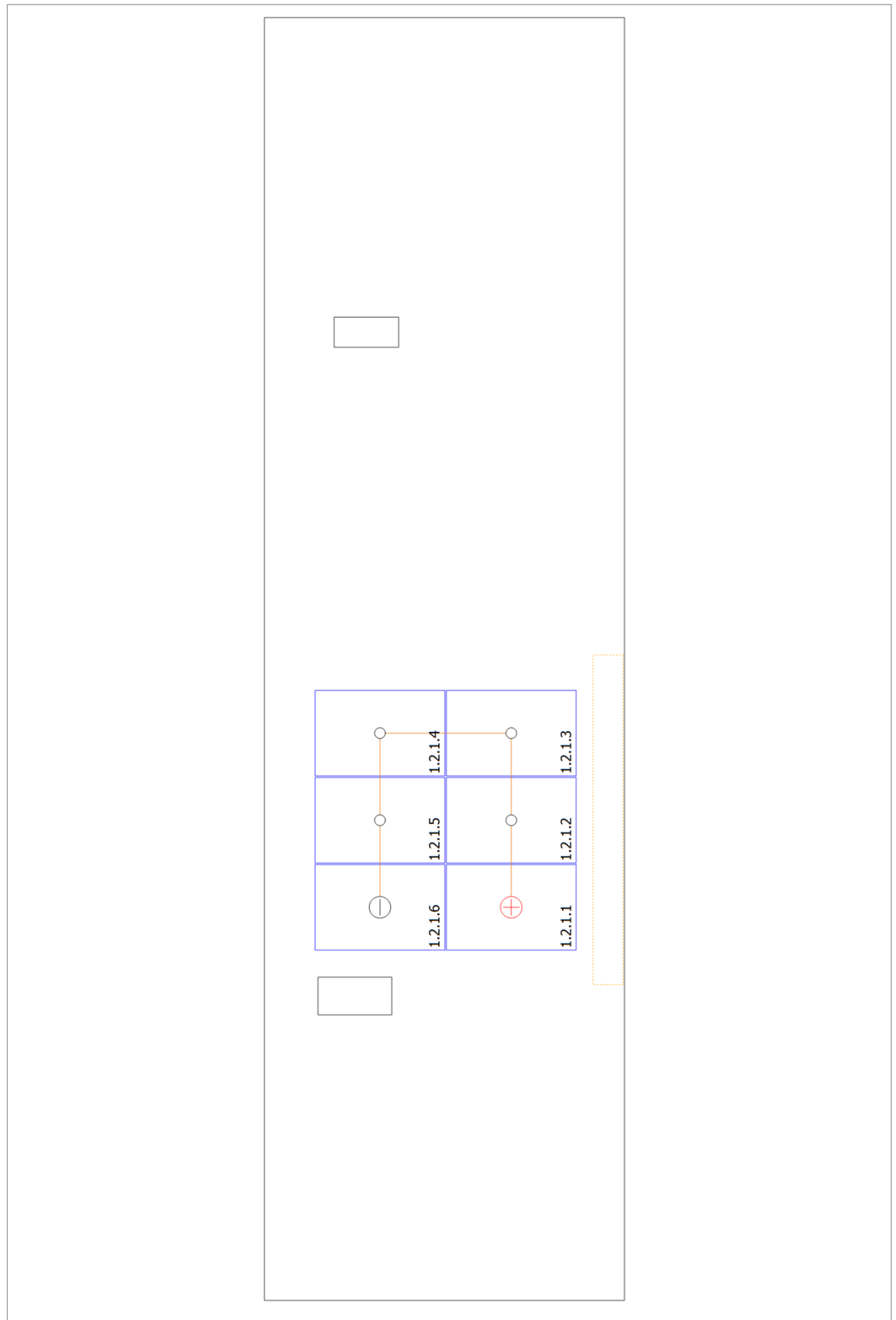


Figure: Building 01 - Roof Area East

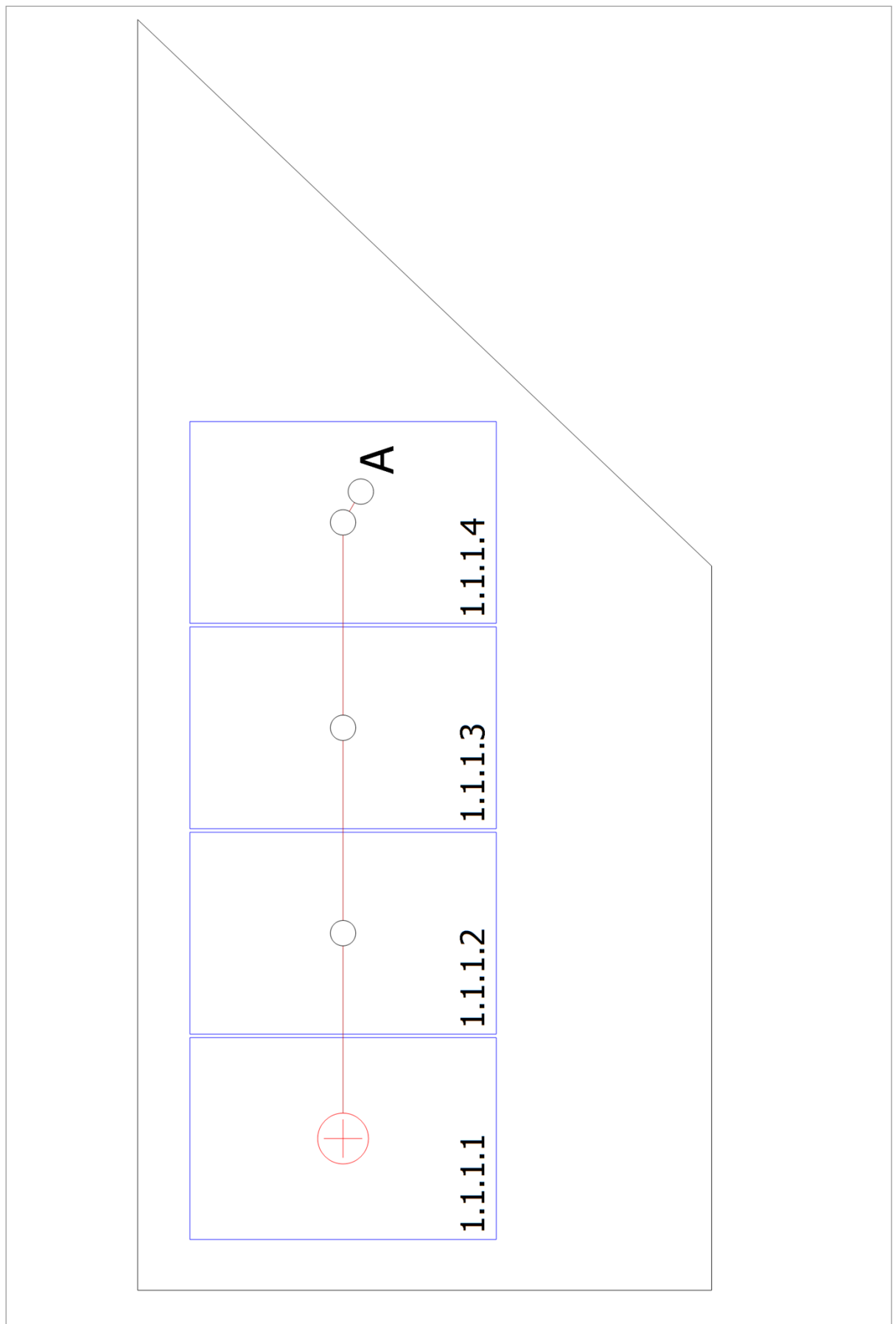


Figure: Building 02 - Roof Area South

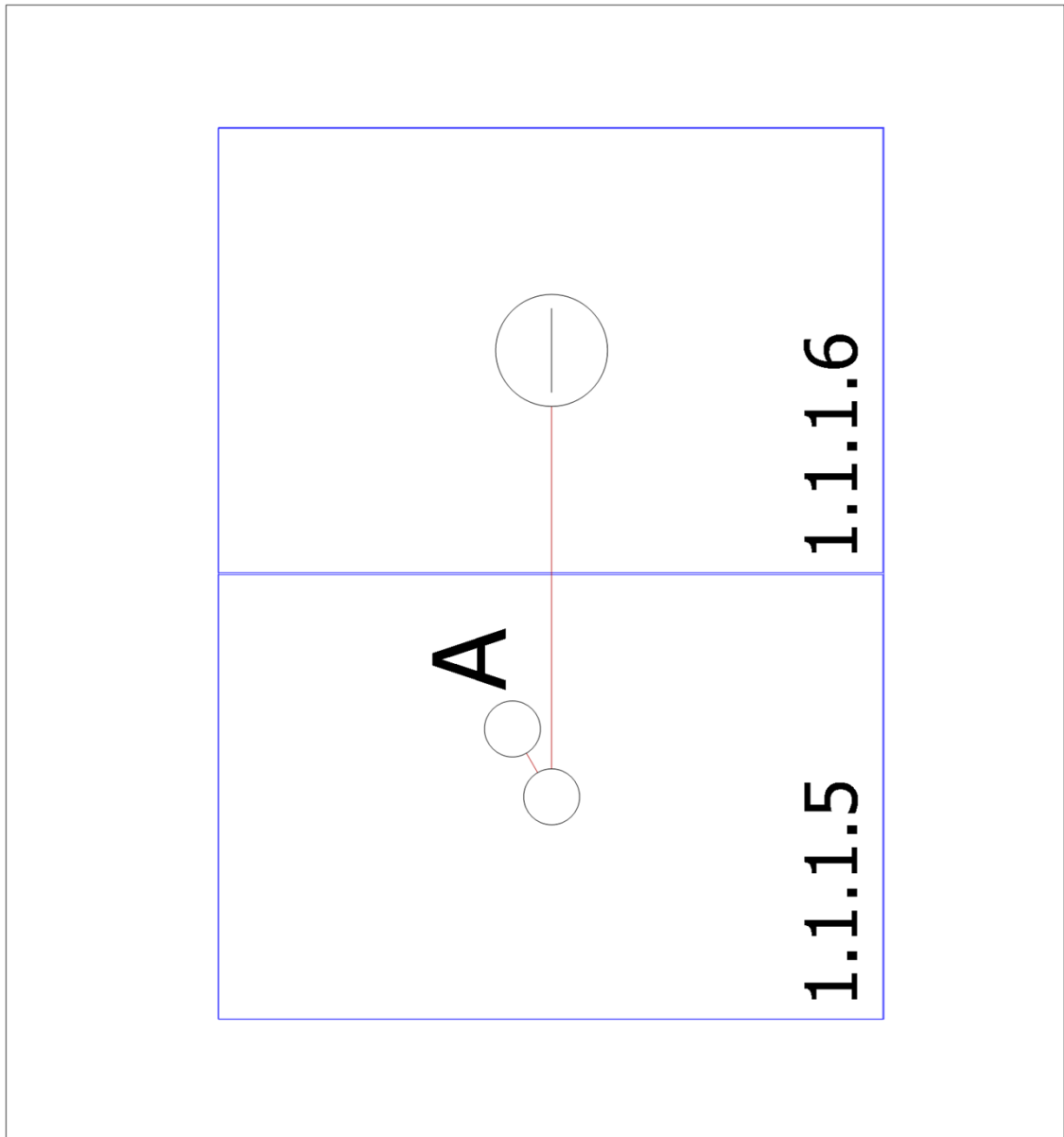


Figure: Building 03 - Roof Area South

## Parts list

### Parts list

| # | Type            | Item number | Manufacturer      | Name                        | Quantity | Unit  |
|---|-----------------|-------------|-------------------|-----------------------------|----------|-------|
| 1 | PV Module       |             | LONGI Solar       | LR5-54 HIB 400 M            | 12       | Piece |
| 2 | Inverter        |             | Ginlong (Solis)   | RHI-3.6K-48ES-5G            | 1        | Piece |
| 3 | Power Optimizer |             | Tigo Energy, Inc. | TS4-A-O 700 W               | 6        | Piece |
| 4 | Battery System  |             | Ginlong (Solis)   | RHI-3.6K-48ES-5G+US3000C    | 1        | Piece |
| 5 | Components      |             |                   | Feed-in Meter               | 1        | Piece |
| 6 | Components      |             |                   | Circuit Breaker AC Isolator | 2        | Piece |
| 7 | Components      |             |                   | House connection            | 1        | Piece |
| 8 | Components      |             |                   | Bidirectional Meter         | 1        | Piece |

## Screenshots, 3D Design Environment

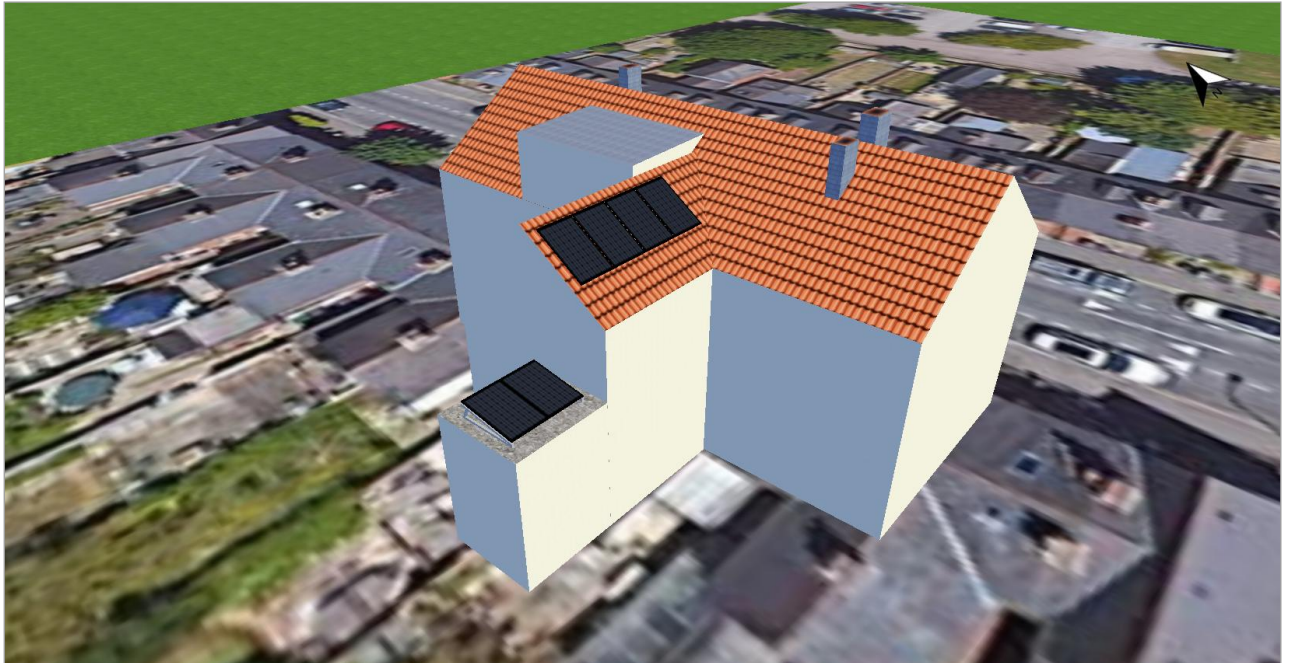


Figure: Screenshot04

## Configuration



Figure: Screenshot08

## Shading

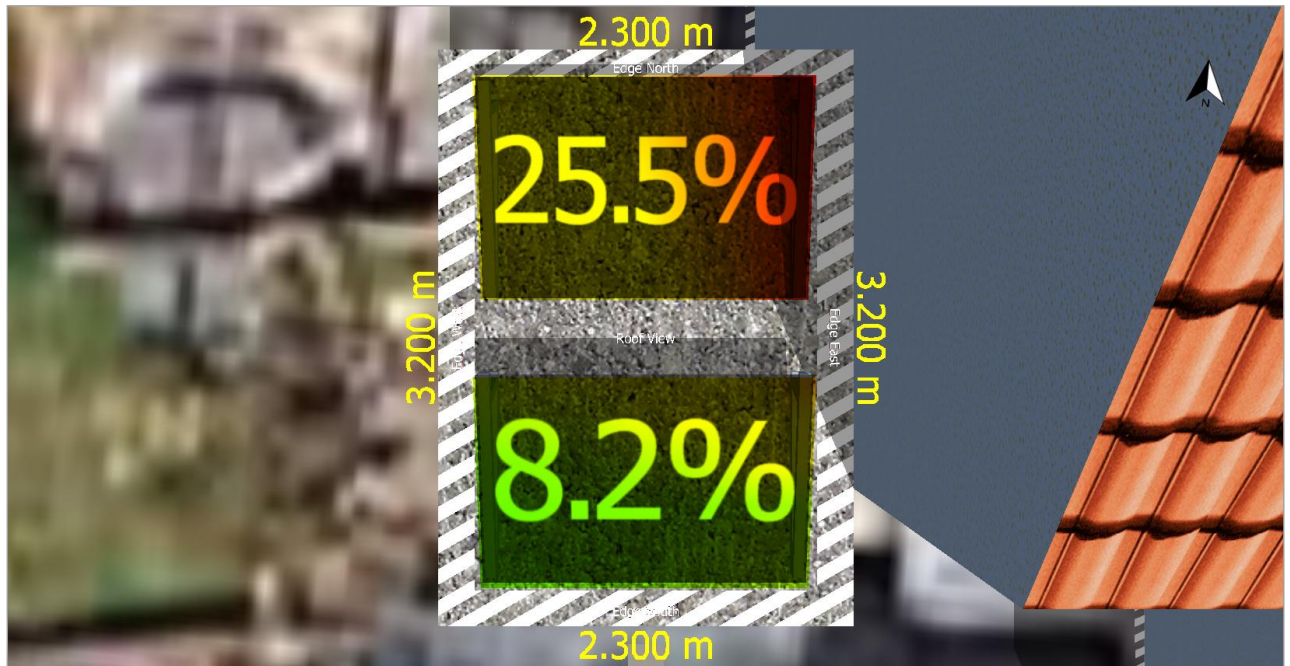


Figure: Screenshot05

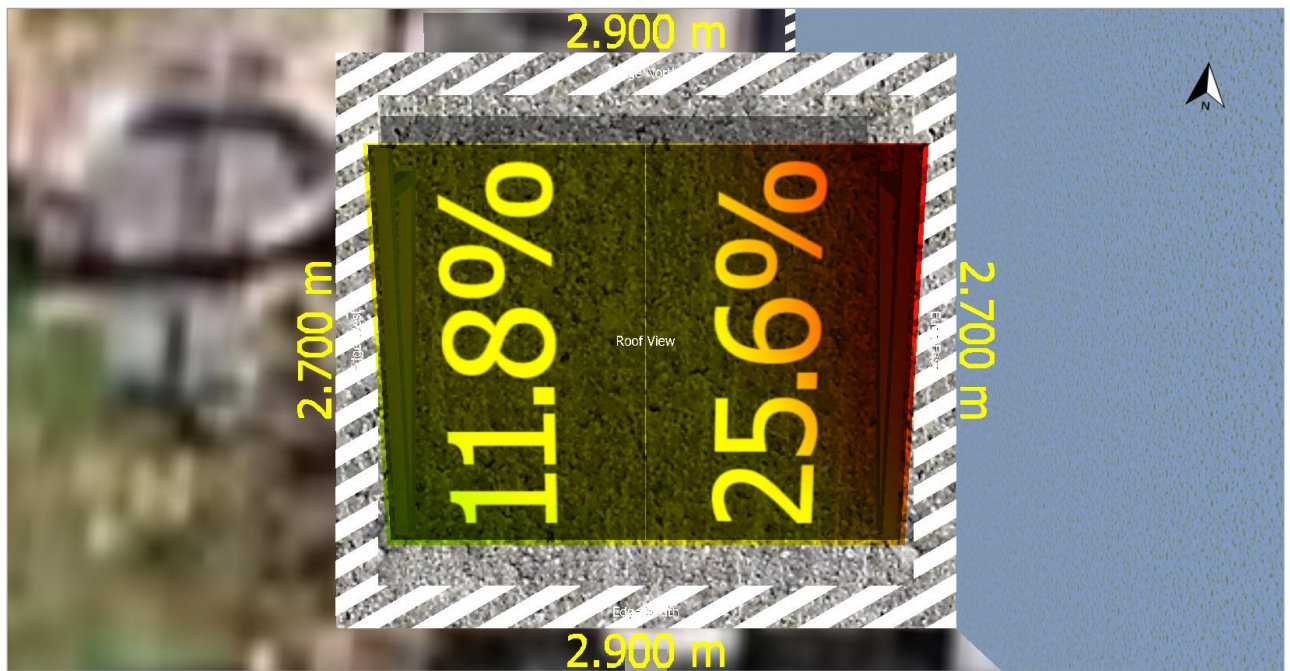


Figure: Screenshot07