



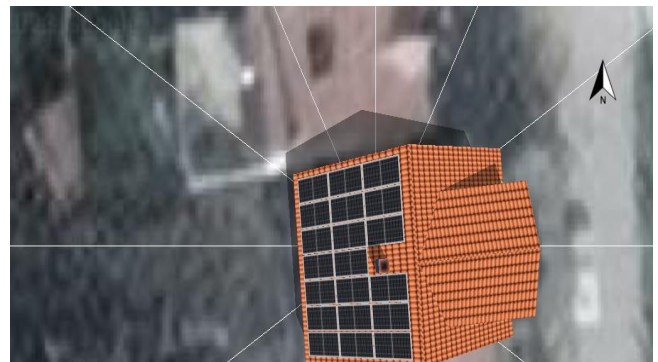
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26-May-23

## Your PV system from SP Solar

Address of Installation



# Project Overview

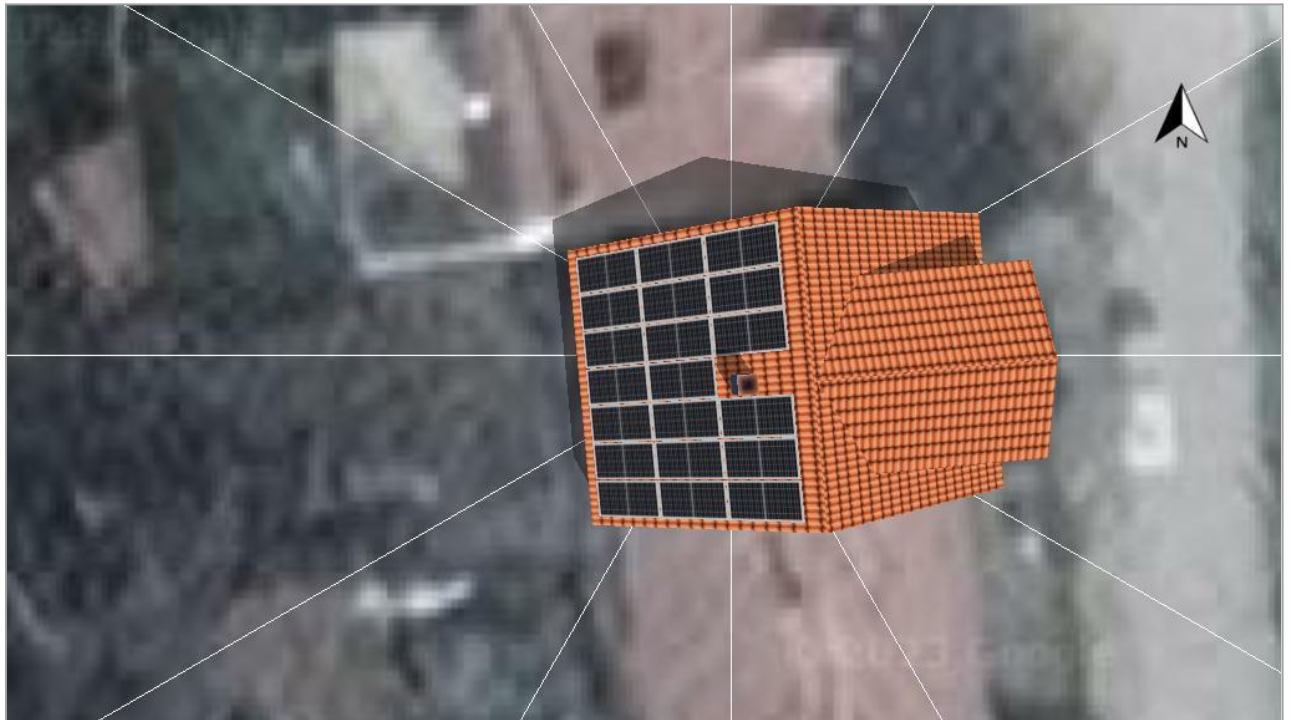


Figure: Overview Image, 3D Design

## PV System

3D, Grid-connected PV System

Climate Data		Novi Sad, SRB (1991 - 2010)	
PV Generator Output		9	kWp
PV Generator Surface		44.4	m <sup>2</sup>
Number of PV Modules		20	
Number of Inverters		1	

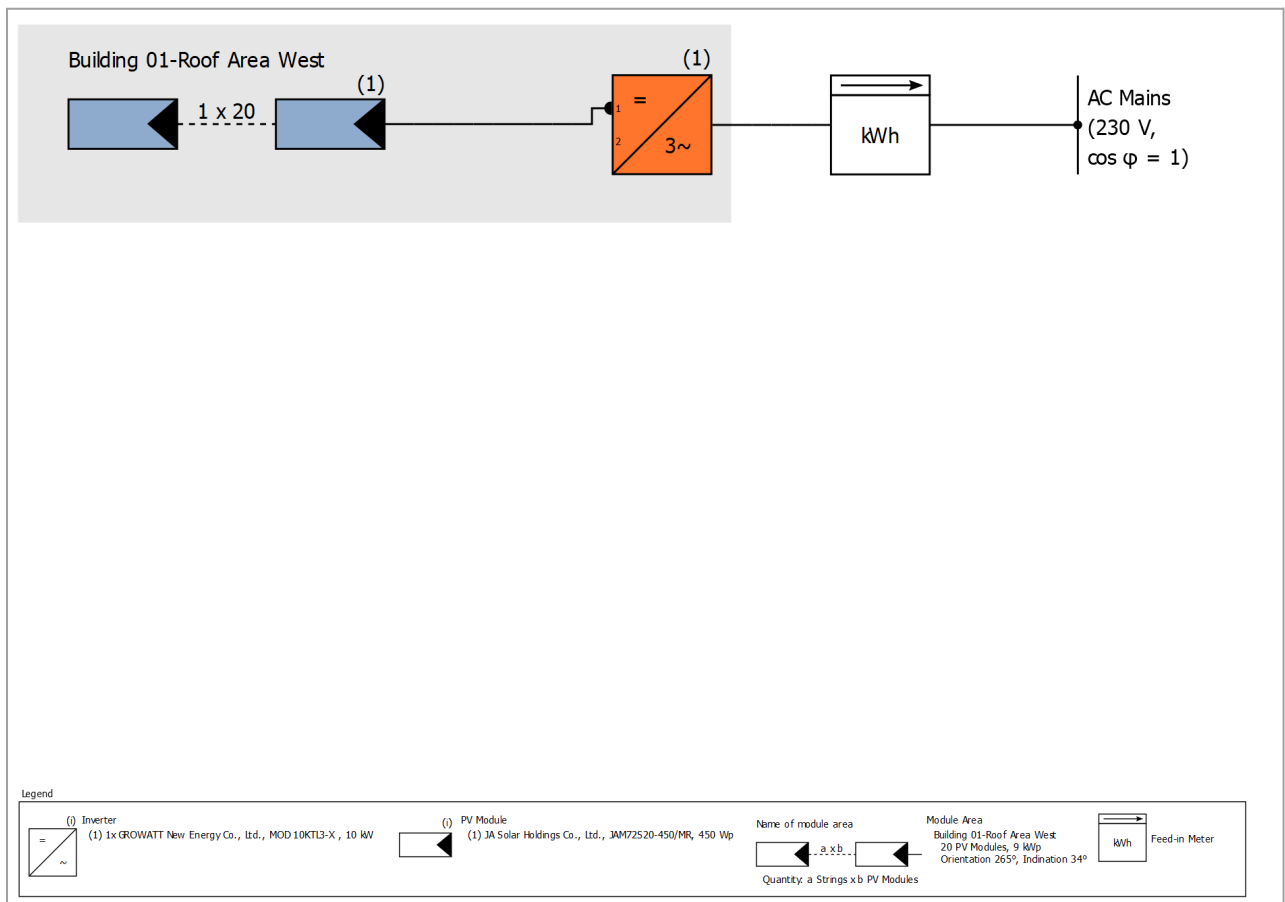


Figure: Schematic diagram

## The yield

The yield

PV Generator Energy (AC grid)	9,751 kWh
Grid Feed-in	9,751 kWh
Down-regulation at Feed-in Point	0 kWh
Own Power Consumption	0.0 %
Solar Fraction	0.0 %
Spec. Annual Yield	1,082.45 kWh/kWp
Performance Ratio (PR)	85.1 %
Yield Reduction due to Shading	4.8 %/Year
CO <sub>2</sub> Emissions avoided	4,579 kg / year

## Financial Analysis

Your Gain

Total investment costs	13,500.00 €
Return on Assets	3.74 %
Amortization Period	15.3 Years
Electricity Production Costs	0.07 €/kWh
Energy Balance/Feed-in Concept	Full Feed-in

## SP Solar

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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
Start of Operation	26-May-23

### Climate Data

Location	Novi Sad, SRB (1991 - 2010)
Resolution of the data	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

## Module Areas

### 1. Module Area - Building 01-Roof Area West

#### PV Generator, 1. Module Area - Building 01-Roof Area West

Name	Building 01-Roof Area West
PV Modules	20 x JAM72S20-450/MR (v2)
Manufacturer	JA Solar Holdings Co., Ltd.
Inclination	34 °
Orientation	West 265 °
Installation Type	Roof parallel
PV Generator Surface	44.4 m <sup>2</sup>

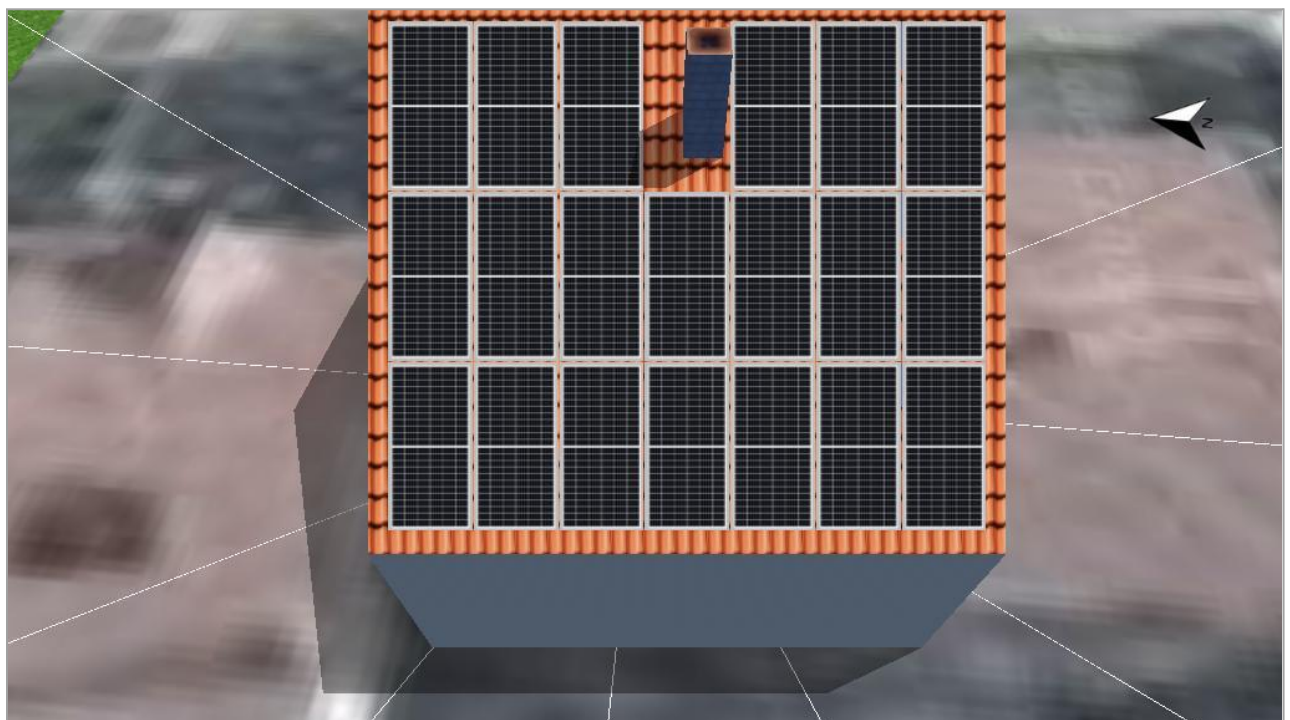


Figure: 1. Module Area - Building 01-Roof Area West

## Horizon Line, 3D Design

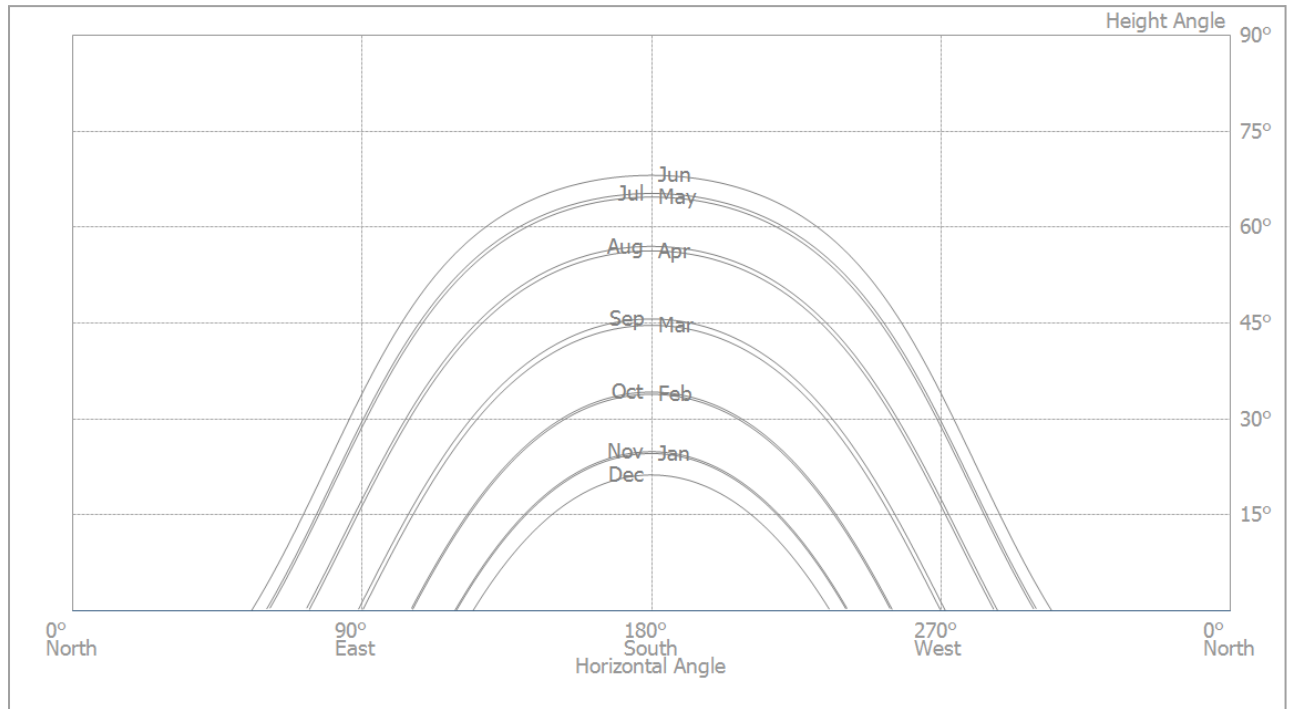


Figure: Horizon (3D Design)

## Inverter configuration

### Configuration 1

Module Area		Building 01-Roof Area West
Inverter 1		
Model		MOD 10KTL3-X (v1)
Manufacturer		GROWATT New Energy Co., Ltd.
Quantity		1
Sizing Factor		90 %
Configuration		MPP 1: 1 x 20
		MPP 2: not allocated

## AC Mains

### AC Mains

Number of Phases		3
Mains Voltage (1-phase)		230 V
Displacement Power Factor (cos phi)		+/- 1

# Simulation Results

## Results Total System

### PV System

PV Generator Output	9 kWp
Spec. Annual Yield	1,082.45 kWh/kWp
Performance Ratio (PR)	85.1 %
Yield Reduction due to Shading	4.8 %/Year
Grid Feed-in	9,751 kWh/Year
Grid Feed-in in the first year (incl. module degradation)	9,751 kWh/Year
Standby Consumption (Inverter)	9 kWh/Year
CO <sub>2</sub> Emissions avoided	4,579 kg / year

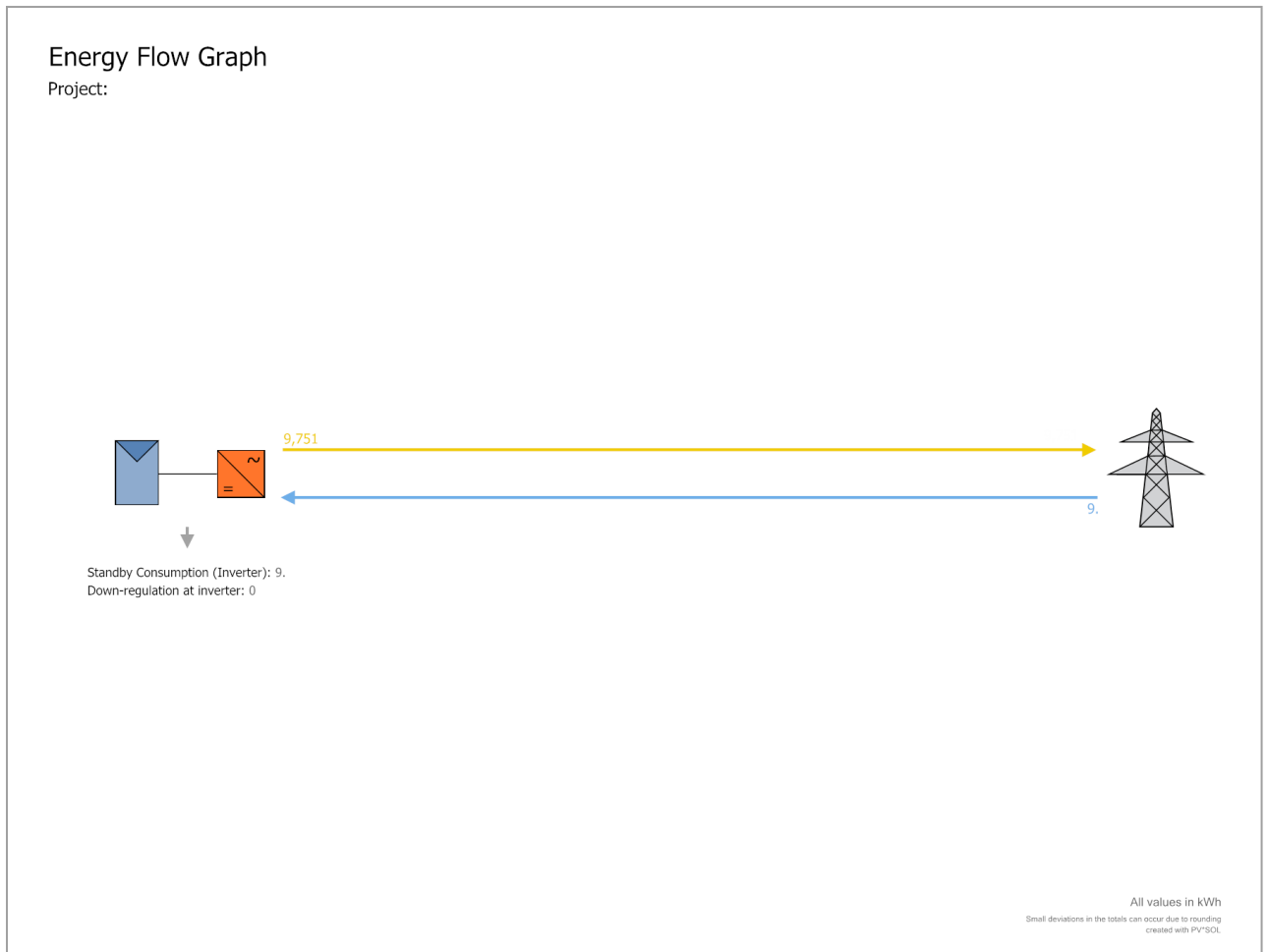


Figure: Energy Flow Graph

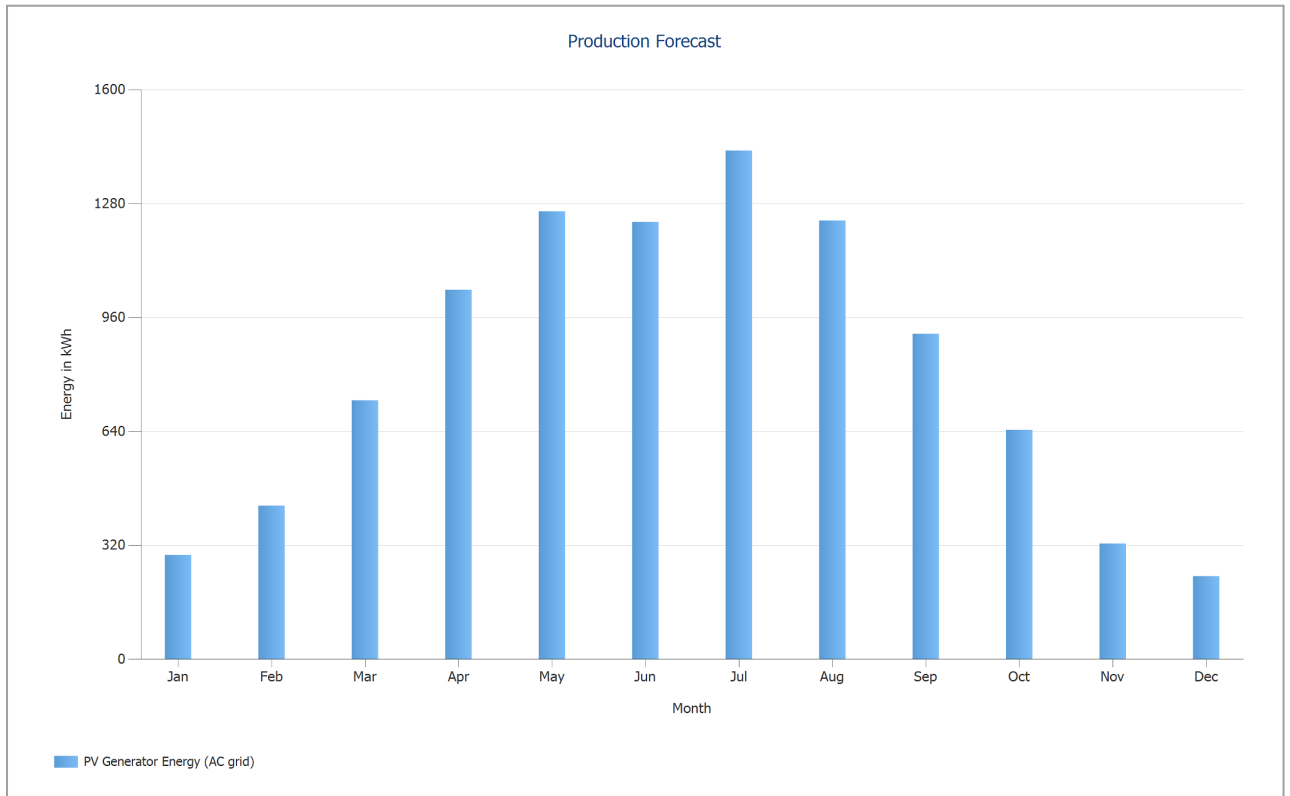


Figure: Production Forecast



# Financial Analysis

## Overview

### System Data

Grid Feed-in in the first year (incl. module degradation)	9,751 kWh/Year
PV Generator Output	9 kWp
Start of Operation of the System	26-May-23
Assessment Period	20 Years
Interest on Capital	1 %

### Economic Parameters

Return on Assets	3.74 %
Accrued Cash Flow (Cash Balance)	4,349.68 €
Amortization Period	15.3 Years
Electricity Production Costs	0.07 €/kWh

### Payment Overview

Specific Investment Costs	1,500.00 €/kWp
Investment Costs	13,500.00 €
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	962.41 €/Year
EEG 2020 (Januar) - Gebäudeanlage	
Validity	26-May-23 - 31-Dec-43
Specific feed-in / export Remuneration	0.0987 €/kWh
Feed-in / Export Tariff	962.41 €/Year

## Cash flow

### Cashflow Table

	Year 1	Year 2	Year 3	Year 4	Year 5
Investments	(€13,500.00)	€0.00	€0.00	€0.00	€0.00
Feed-in / Export Tariff	€853.71	€943.44	€934.10	€924.85	€915.70
<b>Annual Cash Flow</b>	<b>(€12,646.29)</b>	<b>€943.44</b>	<b>€934.10</b>	<b>€924.85</b>	<b>€915.70</b>
Accrued Cash Flow (Cash Balance)	(€12,646.29)	(€11,702.85)	(€10,768.74)	(€9,843.89)	(€8,928.20)
	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	€906.63	€897.65	€888.77	€879.97	€871.25
<b>Annual Cash Flow</b>	<b>€906.63</b>	<b>€897.65</b>	<b>€888.77</b>	<b>€879.97</b>	<b>€871.25</b>
Accrued Cash Flow (Cash Balance)	(€8,021.57)	(€7,123.91)	(€6,235.15)	(€5,355.18)	(€4,483.93)

	<b>Year 11</b>	<b>Year 12</b>	<b>Year 13</b>	<b>Year 14</b>	<b>Year 15</b>
Investments	€0.00	€0.00	€0.00	€0.00	€0.00
Feed-in / Export Tariff	€862.63	€854.09	€845.63	€837.26	€828.97
<b>Annual Cash Flow</b>	<b>€862.63</b>	<b>€854.09</b>	<b>€845.63</b>	<b>€837.26</b>	<b>€828.97</b>
Accrued Cash Flow (Cash Balance)	(€3,621.30)	(€2,767.21)	(€1,921.58)	(€1,084.32)	(€255.36)
	<b>Year 16</b>	<b>Year 17</b>	<b>Year 18</b>	<b>Year 19</b>	<b>Year 20</b>
Investments	€0.00	€0.00	€0.00	€0.00	€0.00
Feed-in / Export Tariff	€820.76	€812.63	€804.59	€796.62	€788.73
<b>Annual Cash Flow</b>	<b>€820.76</b>	<b>€812.63</b>	<b>€804.59</b>	<b>€796.62</b>	<b>€788.73</b>
Accrued Cash Flow (Cash Balance)	€565.40	€1,378.04	€2,182.63	€2,979.25	€3,767.98
	<b>Year 21</b>				
Investments	€0.00				
Feed-in / Export Tariff	€581.69				
<b>Annual Cash Flow</b>	<b>€581.69</b>				
Accrued Cash Flow (Cash Balance)	€4,349.68				
<small>Degradation and inflation rates are applied on a monthly basis over the entire observation period. This is done in the first year.</small>					

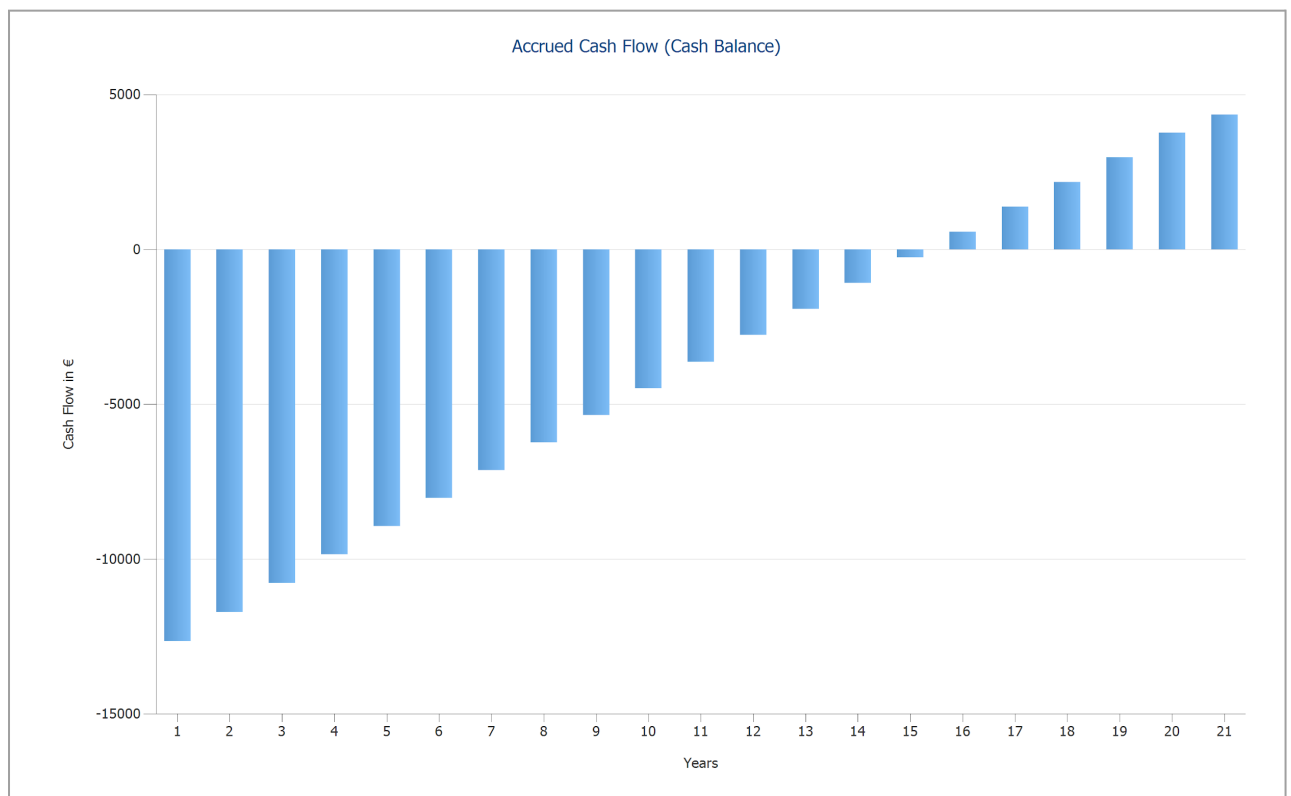


Figure: Accrued Cash Flow (Cash Balance)

# Plans and parts list

## Circuit Diagram

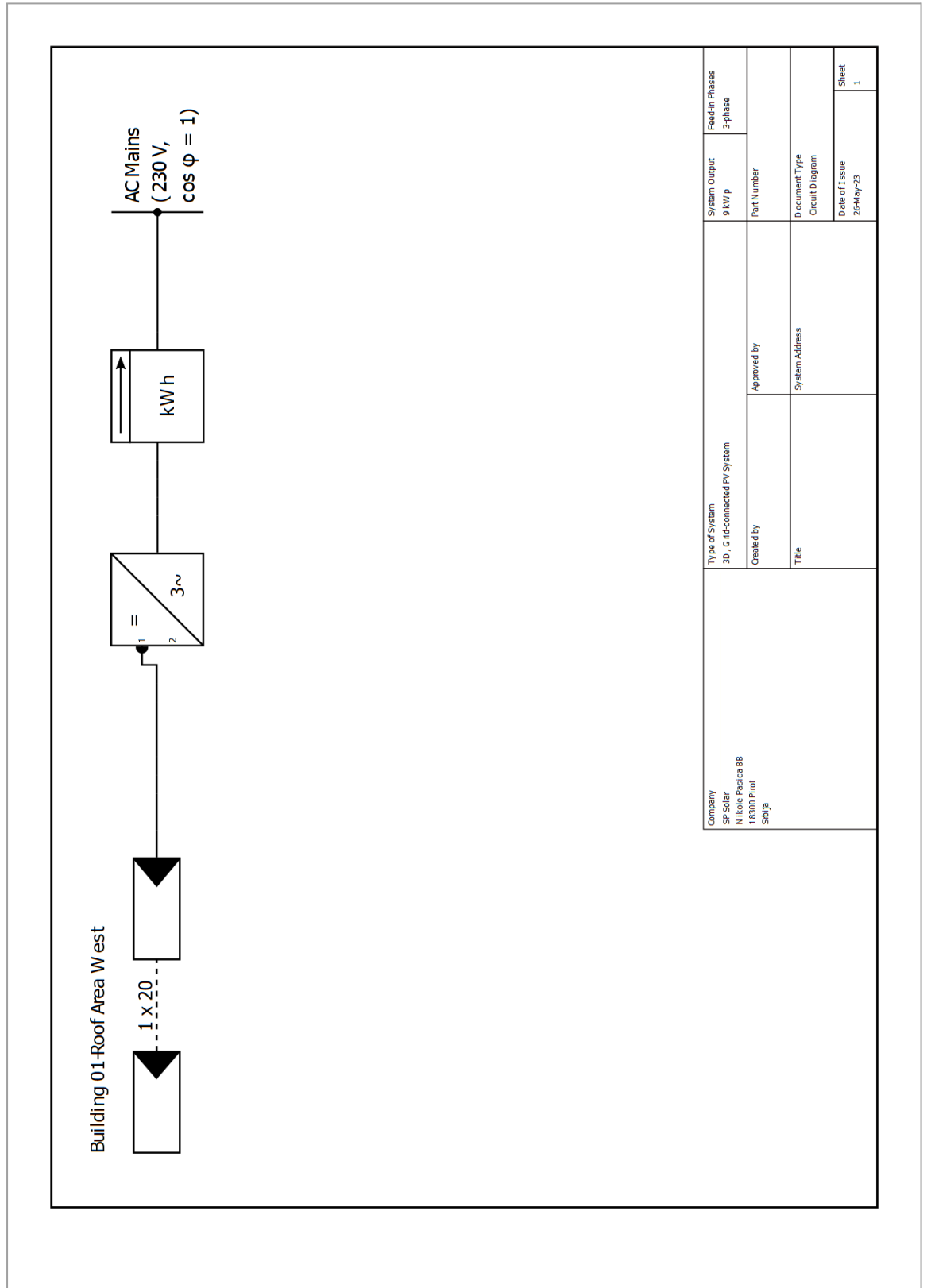


Figure: Circuit Diagram

# Dimensioning Plan

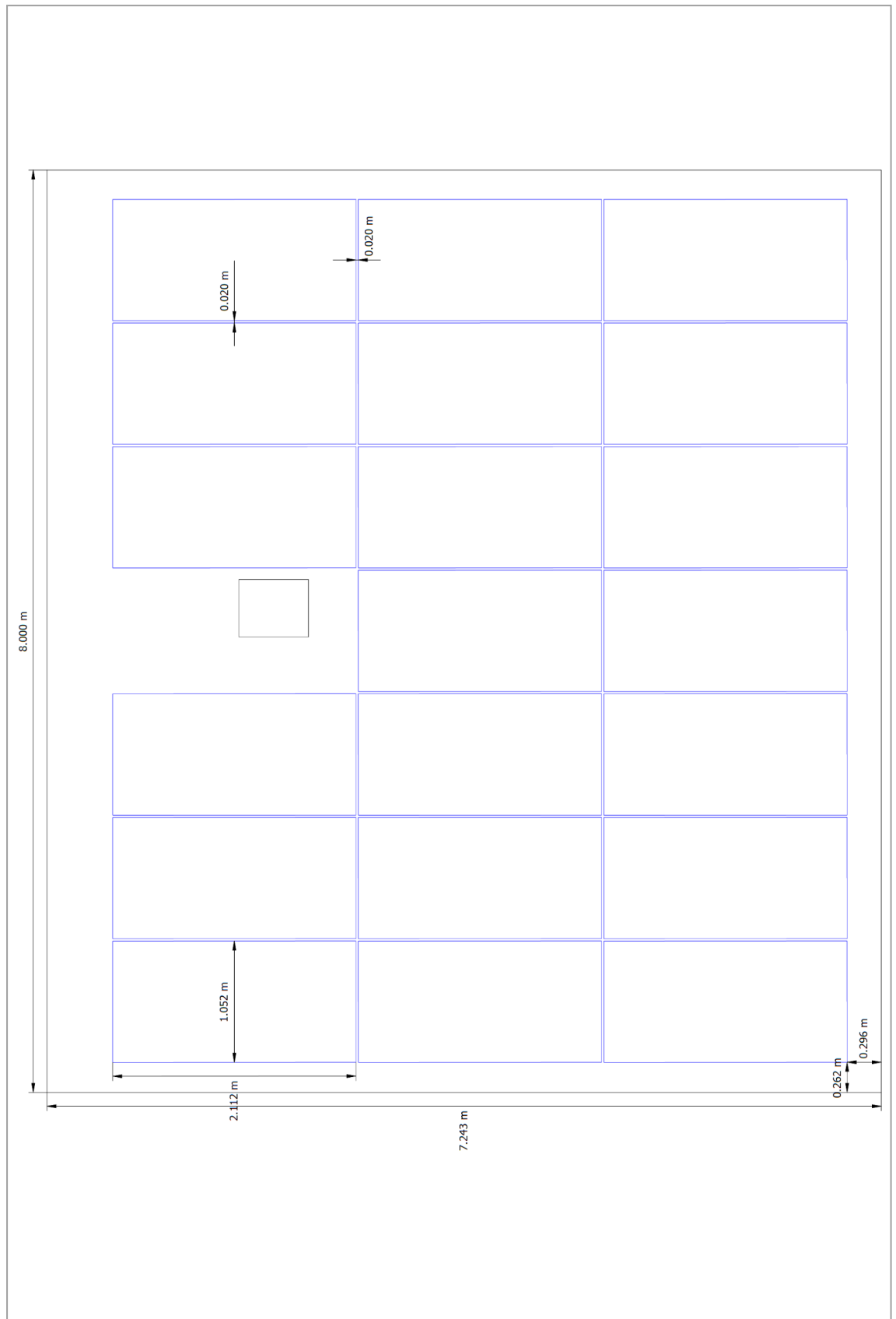


Figure: Building 01-Roof Area West

# String Plan

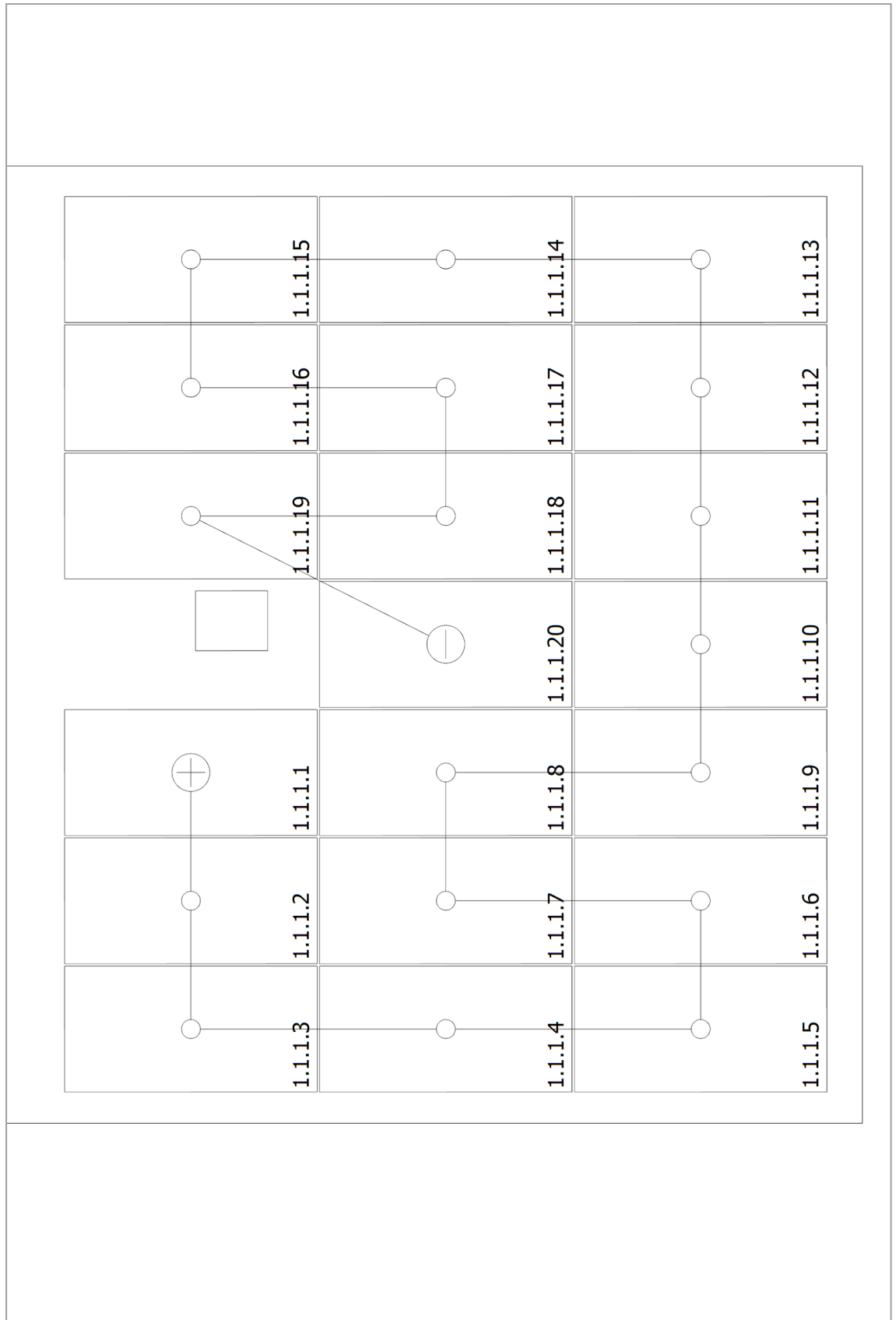


Figure: Building 01-Roof Area West

## Parts list

### Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		JA Solar Holdings Co., Ltd.	JAM72S20-450/MR	20	Piece
2	Inverter		GROWATT New Energy Co., Ltd.	MOD 10KTL3-X	1	Piece
3	Components			Feed-in Meter	1	Piece