

Ringshall Village Hall

Mrs Lacey Luther
Ringshall Village Hall
Lower Farm Road
Ringshall
Stowmarket
Suffolk

Styne Net Zero

Falcon Hall, Finningham Road, Rickinghall, Diss, Norfolk
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UK

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Customer No.: NZ194

Project Name: Ringshall Village Hall

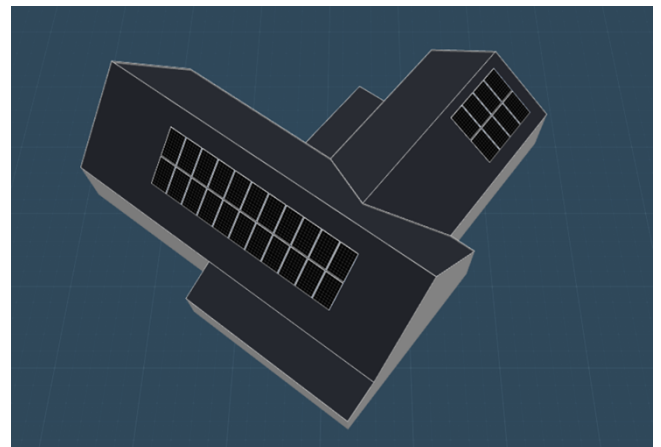
Offer no.: 1

26/04/2024

Your PV system from Styne Net Zero

Address of Installation

Ringshall Village Hall
Lower Farm Road
Ringshall
Stowmarket
Suffolk



Project Description:

13.50kWp Roof Mounted Solar Pv Installation c/w 23.20kWh Battery Storage System.

Project Overview

PV System

Grid-connected PV System with Electrical Appliances and Battery Systems

Climate Data	Norwich Wea Centre, GBR (2001 - 2020)
Values source	Meteonorm 8.2
PV Generator Output	13.5 kWp
PV Generator Surface	61.2 m ²
Number of PV Modules	30
Number of Inverters	1
No. of battery systems	1

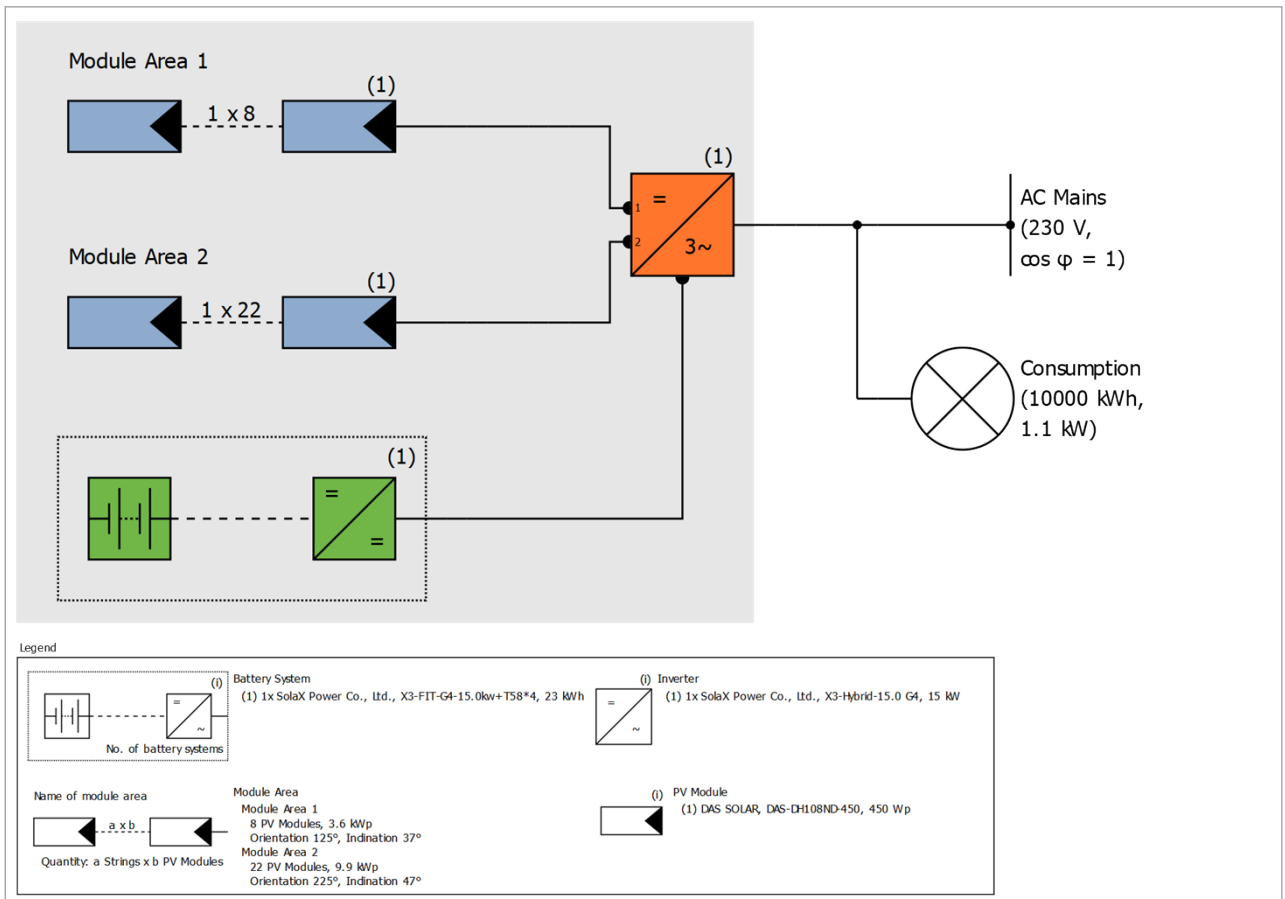


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	13.50 kWp
Spec. Annual Yield	1,074.48 kWh/kWp
Performance Ratio (PR)	93.75 %
PV Generator Energy (AC grid) with battery	14,148 kWh/Year
Direct Own Use	8,207 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	5,941 kWh/Year
Own Power Consumption	58.0 %
CO ₂ Emissions avoided	6,456 kg / year
Level of Self-sufficiency	81.9 %

Financial Analysis

Your Gain

Total investment costs	24,339.50 £
Internal Rate of Return (IRR)	14.79 %
Amortization Period	7.7 Years
Electricity Production Costs	0.1136 £/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	Grid-connected PV System with Electrical Appliances and Battery Systems
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Climate Data

Location	Norwich Wea Centre, 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	10000 kWh
New	10000 kWh
Load Peak	1.1 kW

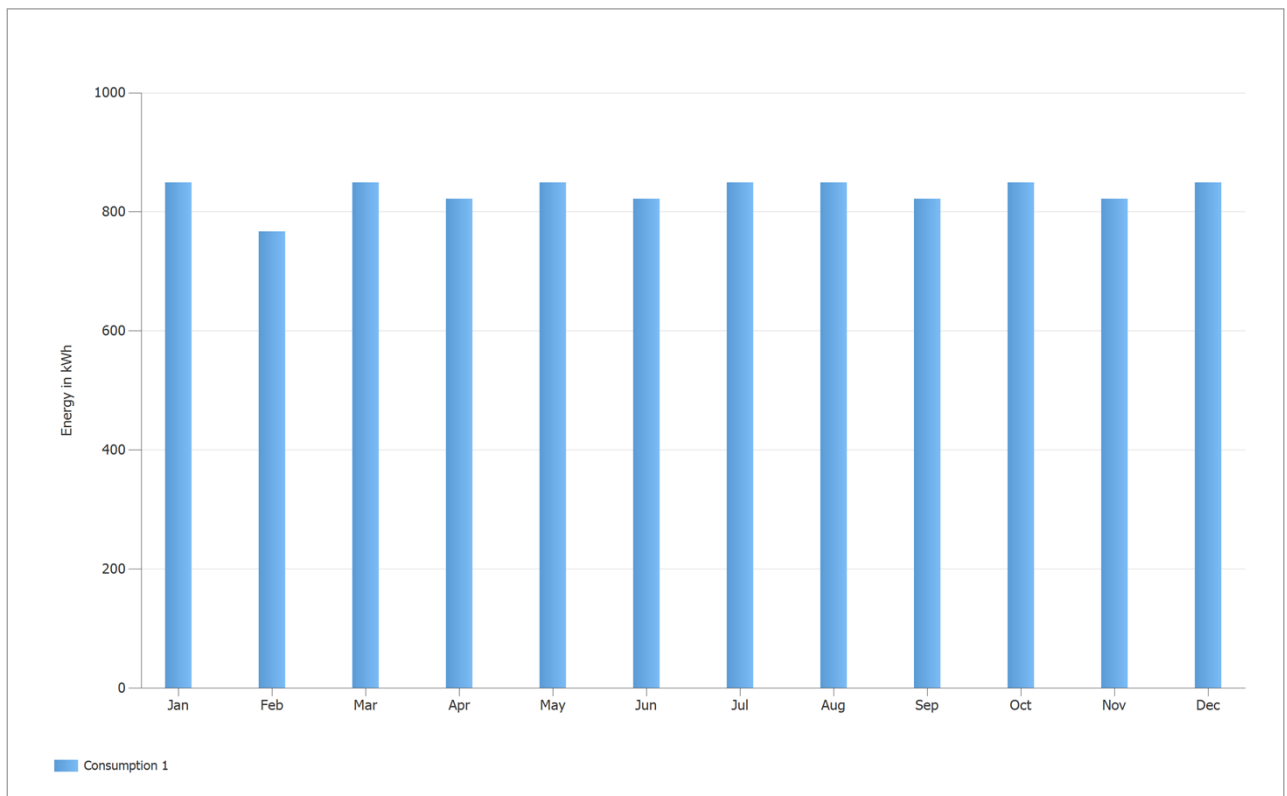


Figure: Consumption

Module Areas

1. Module Area - Module Area 1

PV Generator, 1. Module Area - Module Area 1

Name	Module Area 1
PV Modules	8 x DAS-DH108ND-450 (v1)
Manufacturer	DAS SOLAR
Inclination	37 °
Orientation	Southeast 125 °
Installation Type	Roof parallel
PV Generator Surface	16.3 m ²

2. Module Area - Module Area 2

PV Generator, 2. Module Area - Module Area 2

Name	Module Area 2
PV Modules	22 x DAS-DH108ND-450 (v1)
Manufacturer	DAS SOLAR
Inclination	47 °
Orientation	Southwest 225 °
Installation Type	Roof parallel
PV Generator Surface	44.9 m ²

Inverter configuration

Configuration 1

Module Areas	Module Area 1 + Module Area 2
Inverter 1	
Model	X3-Hybrid-15.0 G4 (v7)
Manufacturer	SolaX Power Co., Ltd.
Quantity	1
Sizing Factor	90 %
Configuration	MPP 1: 1 x 8 MPP 2: 1 x 22

AC Mains

AC Mains

Number of Phases	3
Mains voltage between phase and neutral	230 V
Displacement Power Factor (cos phi)	+/- 1

Battery Systems

Battery System - Group 1

Model	X3-FIT-G4-15.0kw+T58*4 (v1)
Manufacturer	SolaX Power Co., Ltd.
Quantity	1
Battery Inverter	
Type of Coupling	DC intermediate circuit coupling
Nominal output	15 kW
Battery	
Manufacturer	SolaX Power Co., Ltd.
Model	T58 (v1)
Quantity	4
Battery Energy	23 kWh
Battery Type	Lithium iron phosphate

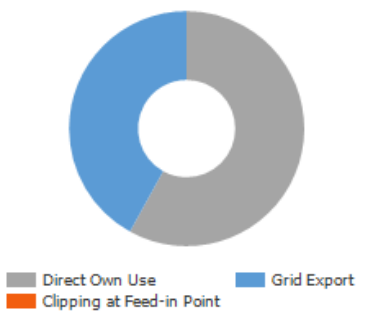
Simulation Results

Results Total System

PV System

PV Generator Output	13.50 kWp
Spec. Annual Yield	1,074.48 kWh/kWp
Performance Ratio (PR)	93.75 %
PV Generator Energy (AC grid) with battery	
Direct Own Use	8,207 kWh/Year
Clipping at Feed-in Point	0 kWh/Year
Grid Export	5,941 kWh/Year
Own Power Consumption	58.0 %
CO ₂ Emissions avoided	6,456 kg / year

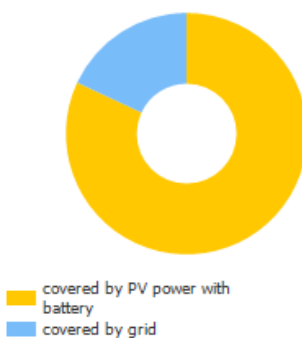
PV Generator Energy (AC grid) with battery



Appliances

Appliances	10,000 kWh/Year
Standby Consumption (Inverter)	15 kWh/Year
Total Consumption	
covered by PV power with battery	8,207 kWh/Year
covered by grid	1,808 kWh/Year
Solar Fraction	81.9 %

Total Consumption



Battery System

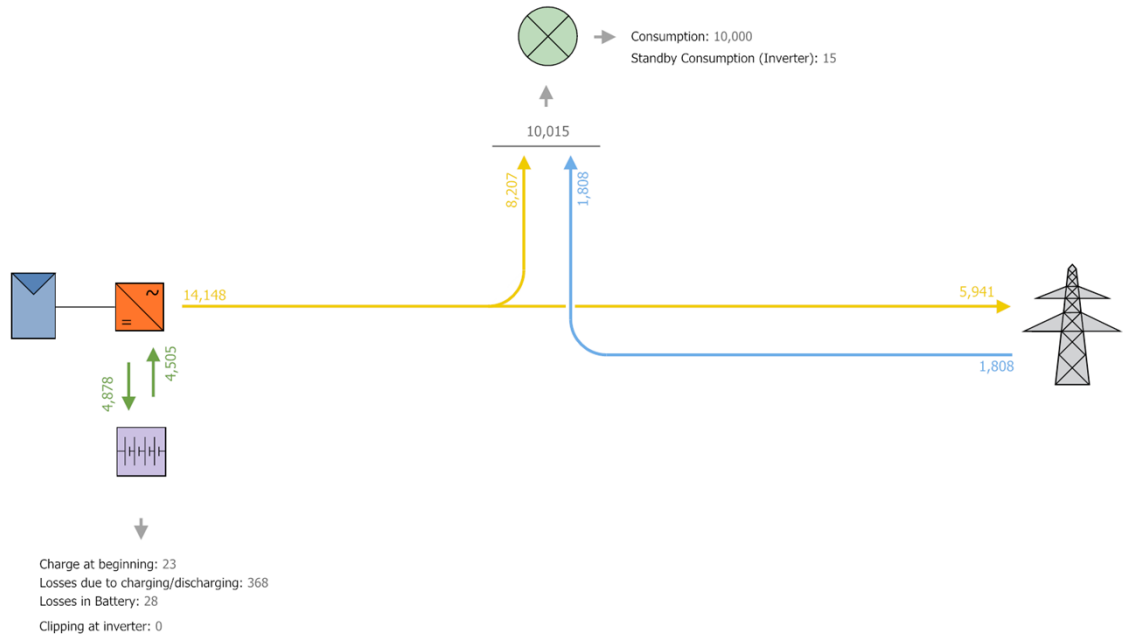
Charge at beginning	23 kWh
Battery Charge (PV System)	4,878 kWh/Year
Battery Energy for the Covering of Consumption	4,505 kWh/Year
Battery discharge into the grid	0 kWh/Year
Losses due to charging/discharging	368 kWh/Year
Losses in Battery	28 kWh/Year
Cycle Load	4.3 %
Service Life	>20 Years

Level of Self-sufficiency

Total Consumption	10,015 kWh/Year
covered by grid	1,808 kWh/Year
Level of Self-sufficiency	81.9 %

Energy Flow Graph

Project: Ringshall Village Hall



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

Figure: Energy flow

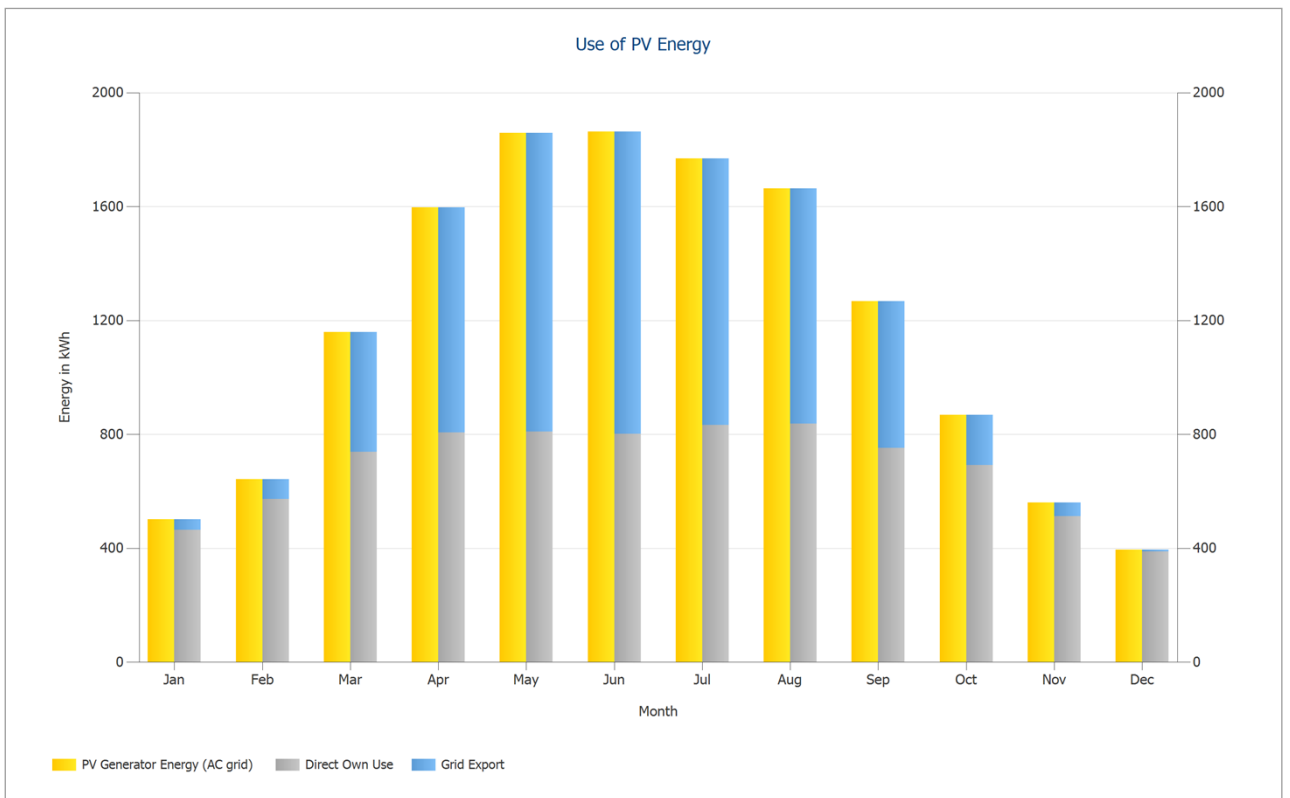


Figure: Use of PV Energy

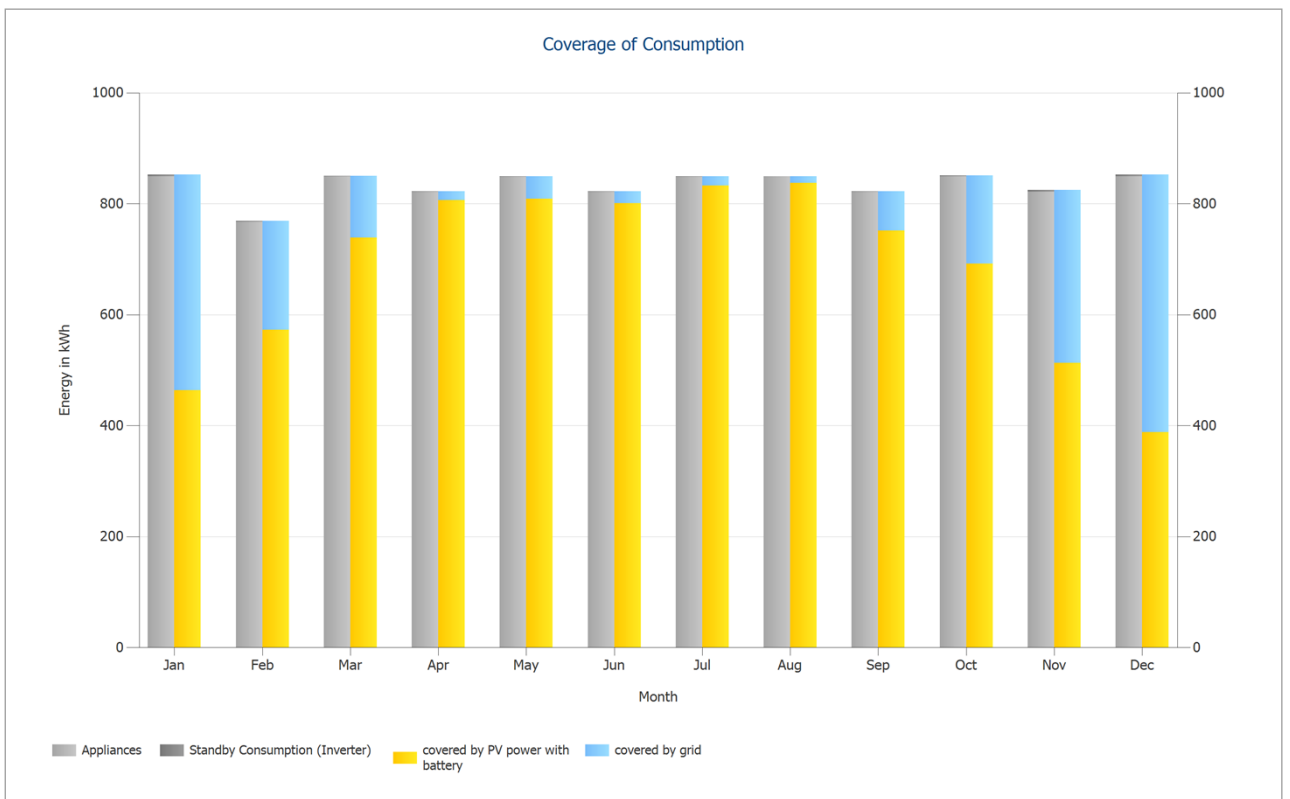


Figure: Coverage of Consumption

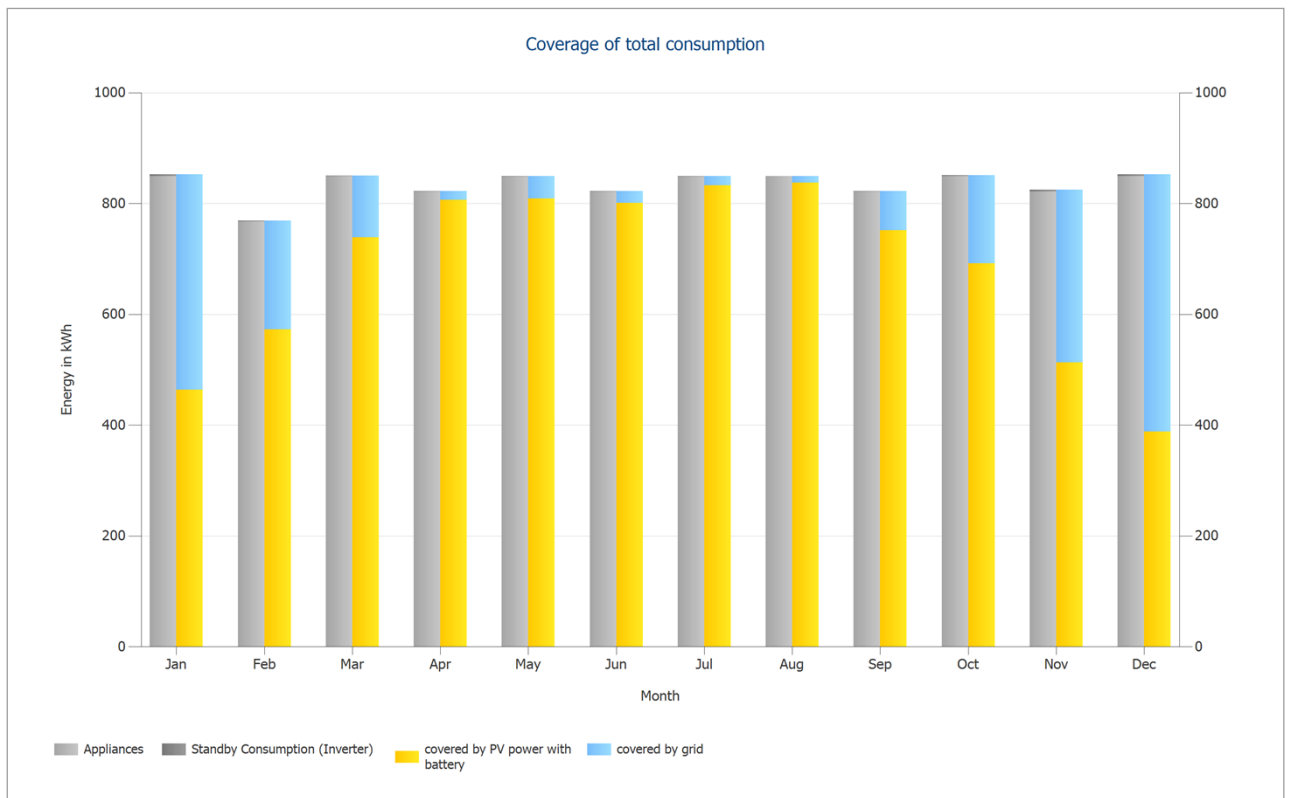


Figure: Coverage of total consumption

Financial Analysis

Overview

System Data

Grid Export in the first year (incl. module degradation)	5,830 kWh/Year
PV Generator Output	13.5 kWp
Start of Operation of the System	26/04/2024
Assessment Period	25 Years
Interest on Capital	1 %

Economic Parameters

Internal Rate of Return (IRR)	14.79 %
Accrued Cash Flow (Cash Balance)	79,779.25 £
Amortization Period	7.7 Years
Electricity Production Costs	0.1136 £/kWh

Payment Overview

Specific Investment Costs	1,802.93 £/kWp
Investment Costs	24,339.50 £
One-off Payments	0.00 £
Incoming Subsidies	0.00 £
Annual Costs	500.00 £/Year
Other Revenue or Savings	0.00 £/Year

Remuneration and Savings

Total Payment from Utility in First Year	874.43 £/Year
First year savings	2,866.85 £/Year

New Tariff (Example)

Energy Price	0.36 £/kWh
Inflation Rate for Energy Price	5 %/Year

Remuneration of Electricity sold to Third Party

Price of Electricity sold to Third Party	0.15 £/kWh
Remuneration of Electricity sold to Third Party	874.43 £/Year

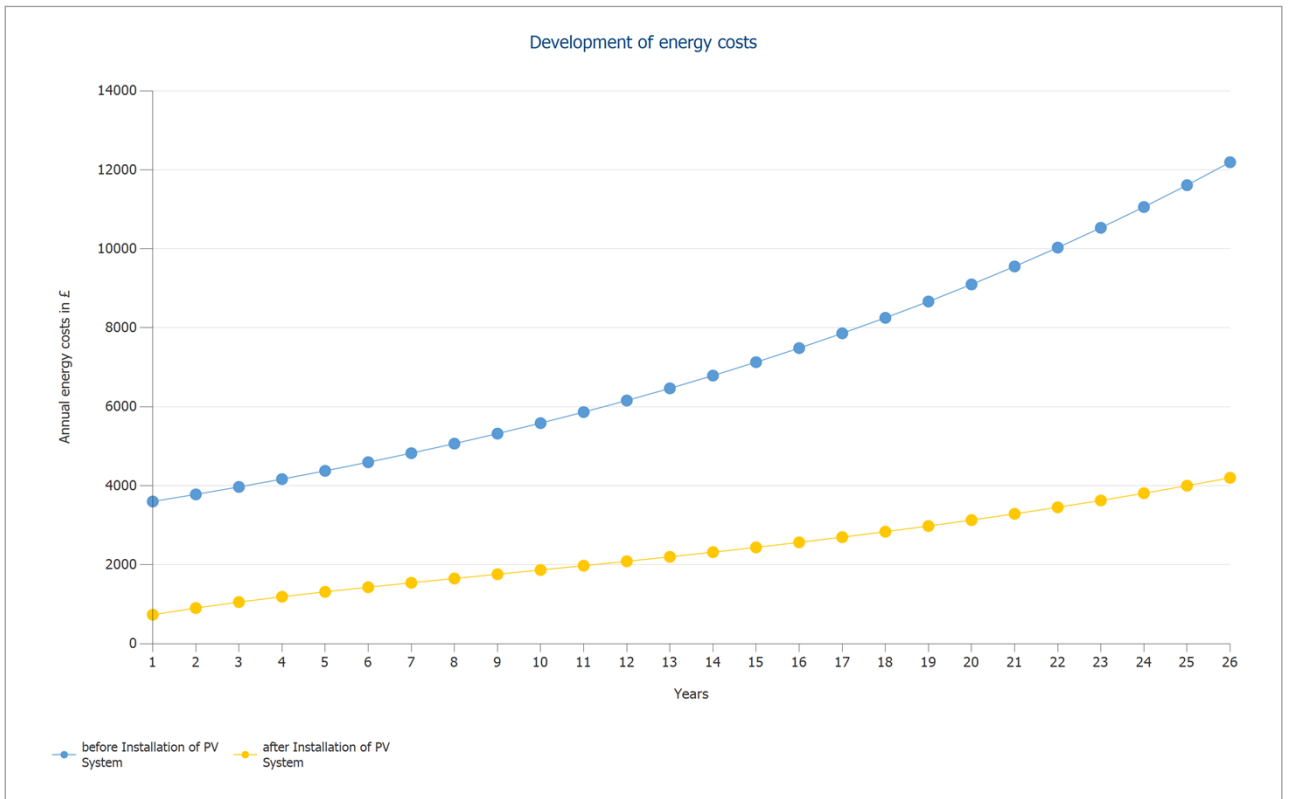


Figure: Development of energy costs

Cash flow

Cash flow

	Year 1	Year 2	Year 3	Year 4	Year 5
Investments	-£24,339.50	£0.00	£0.00	£0.00	£0.00
Operating costs	-£495.05	-£490.15	-£485.30	-£480.49	-£475.73
Feed-in / Export Tariff	£768.48	£817.61	£780.12	£750.56	£726.92
Electricity Savings	£2,702.17	£2,820.28	£2,830.15	£2,862.84	£2,914.31
Annual Cash Flow	-£21,363.90	£3,147.74	£3,124.97	£3,132.91	£3,165.50
Accrued Cash Flow (Cash Balance)	-£21,363.90	-£18,216.16	-£15,091.19	-£11,958.29	-£8,792.79

Cash flow

	Year 6	Year 7	Year 8	Year 9	Year 10
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Operating costs	-£471.02	-£466.36	-£461.74	-£457.17	-£452.64
Feed-in / Export Tariff	£707.69	£691.74	£678.25	£666.61	£656.35
Electricity Savings	£2,981.46	£3,061.91	£3,153.83	£3,255.85	£3,366.96
Annual Cash Flow	£3,218.13	£3,287.29	£3,370.34	£3,465.29	£3,570.66
Accrued Cash Flow (Cash Balance)	-£5,574.66	-£2,287.37	£1,082.97	£4,548.26	£8,118.93

Cash flow

	Year 11	Year 12	Year 13	Year 14	Year 15
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Operating costs	-£448.16	-£443.72	-£439.33	-£434.98	-£430.67
Feed-in / Export Tariff	£647.13	£638.71	£630.89	£623.53	£616.53
Electricity Savings	£3,486.40	£3,613.62	£3,748.28	£3,890.14	£4,039.06
Annual Cash Flow	£3,685.37	£3,808.61	£3,939.84	£4,078.68	£4,224.91
Accrued Cash Flow (Cash Balance)	£11,804.29	£15,612.90	£19,552.74	£23,631.42	£27,856.33

Cash flow

	Year 16	Year 17	Year 18	Year 19	Year 20
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Operating costs	-£426.41	-£422.19	-£418.01	-£413.87	-£409.77
Feed-in / Export Tariff	£609.81	£603.31	£597.00	£590.84	£584.80
Electricity Savings	£4,195.02	£4,358.03	£4,528.19	£4,705.62	£4,890.50
Annual Cash Flow	£4,378.41	£4,539.16	£4,707.18	£4,882.59	£5,065.53
Accrued Cash Flow (Cash Balance)	£32,234.75	£36,773.90	£41,481.09	£46,363.68	£51,429.21

Cash flow

	Year 21	Year 22	Year 23	Year 24	Year 25
Investments	£0.00	£0.00	£0.00	£0.00	£0.00
Operating costs	-£405.72	-£401.70	-£397.72	-£393.78	-£389.88
Feed-in / Export Tariff	£578.88	£573.04	£567.29	£561.62	£556.01
Electricity Savings	£5,083.03	£5,283.44	£5,491.98	£5,708.94	£5,934.61
Annual Cash Flow	£5,256.19	£5,454.78	£5,661.55	£5,876.77	£6,100.74
Accrued Cash Flow (Cash Balance)	£56,685.41	£62,140.19	£67,801.74	£73,678.51	£79,779.25

Degradation and inflation rates are applied on a monthly basis over the entire

observation period. This is done in the first year.

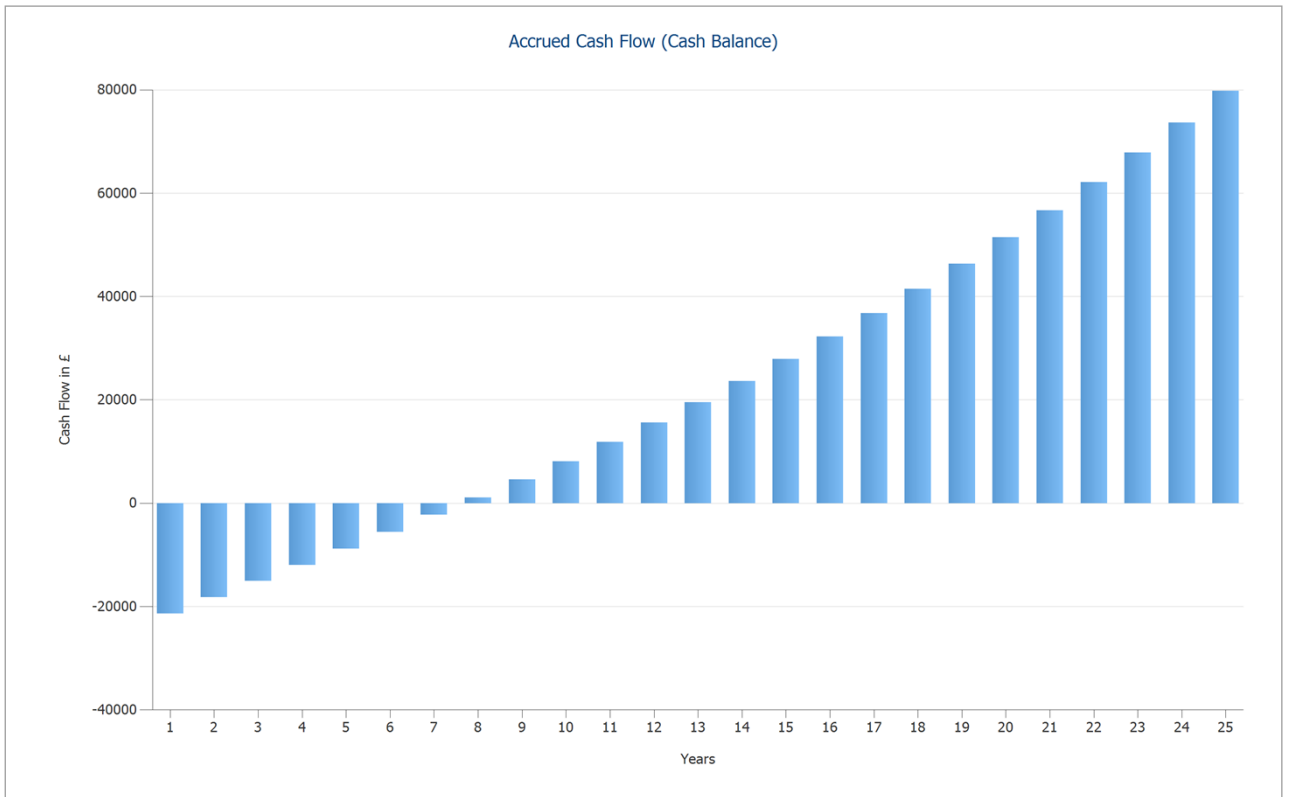


Figure: Accrued Cash Flow (Cash Balance)

Plans and parts list

Circuit Diagram

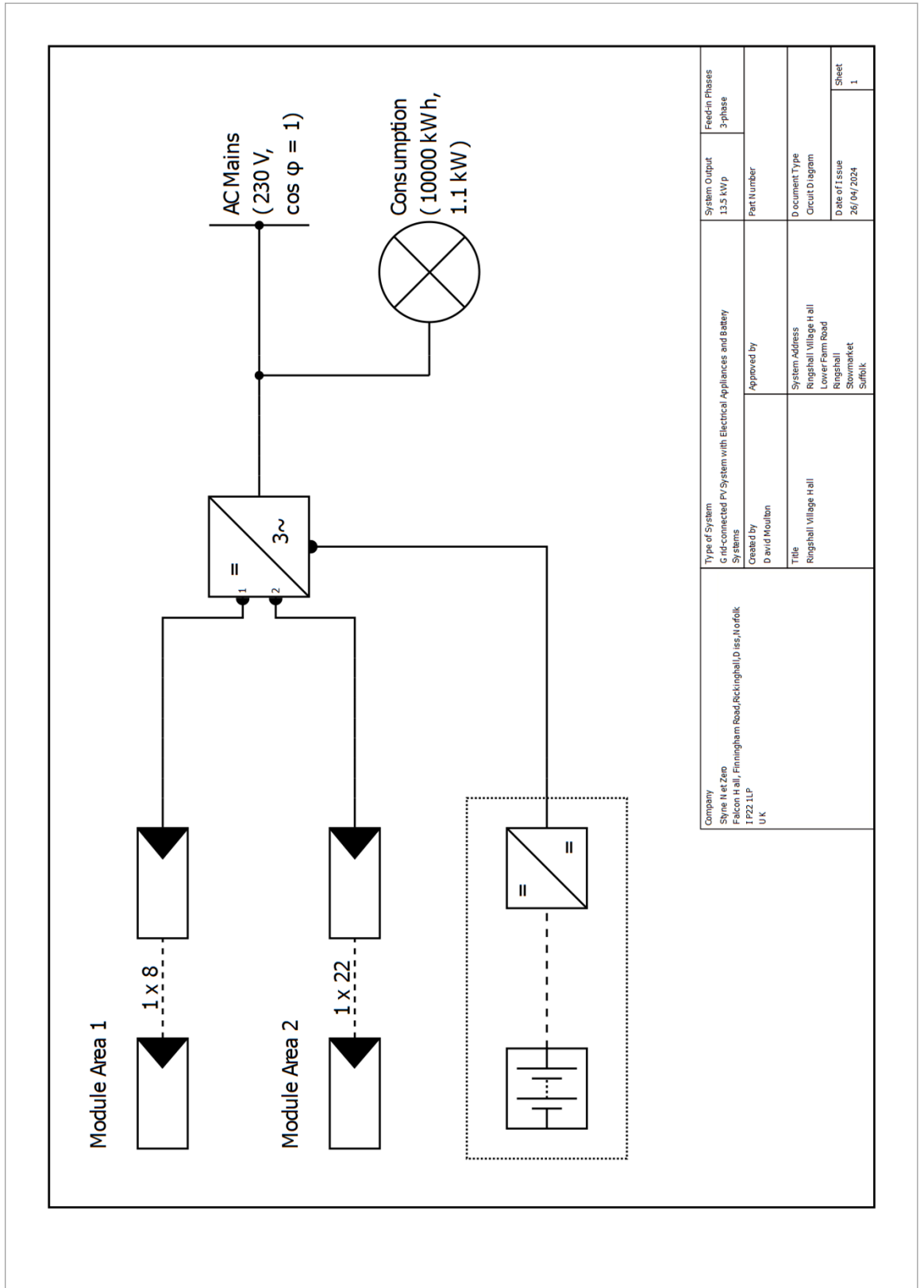


Figure: Circuit Diagram

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		DAS SOLAR	DAS-DH108ND-450	30	Piece
2	Inverter		SolaX Power Co., Ltd.	X3-Hybrid-15.0 G4	1	Piece
3	Battery System		SolaX Power Co., Ltd.	X3-FIT-G4-15.0kw+T58*4	1	Piece