Project Name: Fri Dec 05 2025

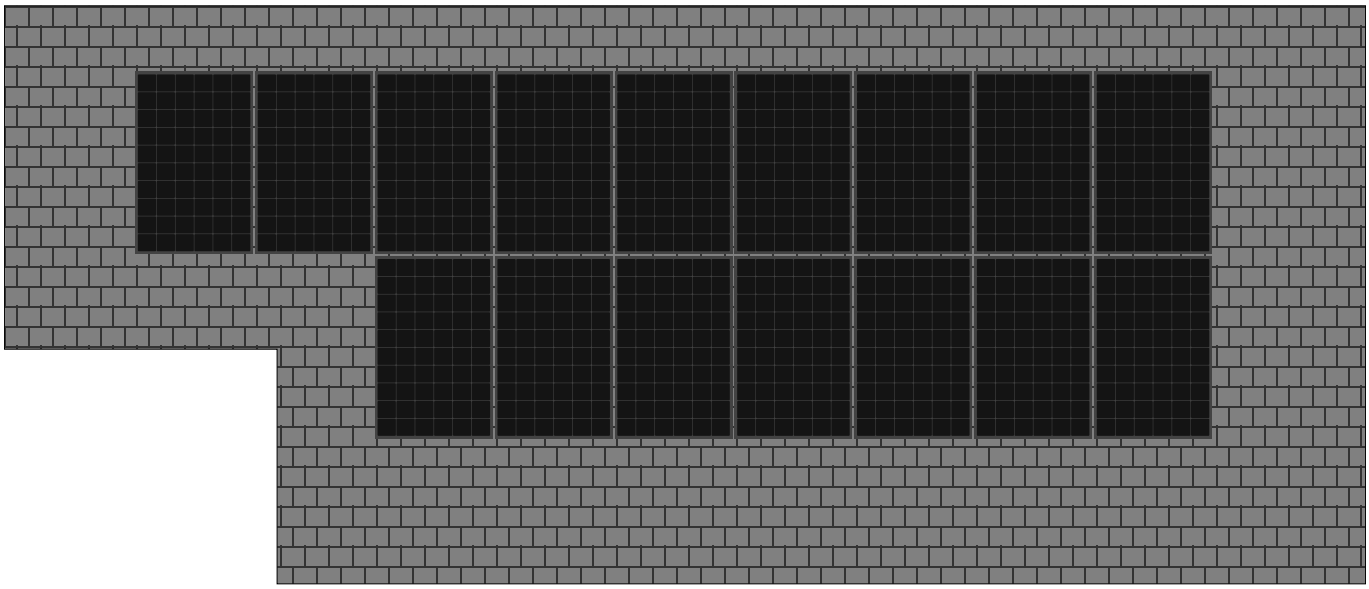
Address: Chapel St, Epworth, Doncaster , DN9 1HJ

Date Created: 5th December 2025

Designer: Stephen Allan

Roof Layout

Roof 1



Component list

Item	Quantity
Aiko Neostar 2S 460W All Black ABC N-Type Mono solar panel	16
Fastensol black universal clamp	36
Fastensol black end cap	8
Fastensol portrait flat tile roof hook	36
Genius speedflash	36
Fastensol rail splice	8
Fastensol silver rail 3550mm	11
Fastensol rail bolt	16
EcoFlow 5kW 1ph (2 MPPTs) inverter	1
EcoFlow Power Ocean LFP 5kWh	2
AC isolator - IMO - 32A 4-pole	2
IMO 25A DC Isolator 4-pole 2-string	2
Tigo TS4-A-O	16
MC4 4mm Connector Pair	4
50m reel of 4mm2 solar cable	1

NET Emlite Bi-directional Meter ECA2.n*	1
Label sheet	1
Battery Hazard Warning Label Pack	1
EcoFlow Power Ocean Battery Base	1
EcoFlow 1ph Meter with 120A CT	1
Battery Warning Label Stickers	1
Battery in Installation Stickers	1

Inverter checks

EcoFlow 5kW 1ph (2 MPPTs)

Panels			
PV power	**7360**	Rated AC output	**5000**

Input 1: 7 Aiko Neostar 2S 460W All Black ABC N-Type Mono solar panels in 1 strings

Panels		Inverter	
PV power	**3220 W**		
Open circuit voltage at -10° C	**310 V**	Max DC voltage	**600 V**
V_{mpp} at 40° C	**234 V**	V_{mpp} lower limit	**90 V**
V_{mpp} at -10° C	**262 V**	V_{mpp} upper limit	**520 V**
I_{mpp} at 40° C	**13 A**	Max DC input current	**16 A**

Max voltage

The open circuit voltage of the solar panels never exceeds the voltage limit of the inverter.

✓

Max power point range

The maximum power point voltage of the solar panels is always above the lower limit of the inverter MPPT tracker. The maximum power point voltage of the solar panels is always below the upper limit of the inverter MPPT tracker.

✓

Max Current

The maximum power point current of the solar panels is always below the maximum current for the inverter MPPT tracker.

Input 2: 9 Aiko Neostar 2S 460W All Black ABC N-Type Mono solar panels in 1 strings

Panels		**Inverter**	
PV power	**4140 W**		
Open circuit voltage at -10° C	**399 V**	Max DC voltage	**600 V**
V_{mpp} at 40° C	**301 V**	V_{mpp} lower limit	**90 V**
V_{mpp} at -10° C	**336 V**	V_{mpp} upper limit	**520 V**
I_{mpp} at 40° C	**13 A**	Max DC input current	**16 A**

Max voltage

The open circuit voltage of the solar panels never exceeds the voltage limit of the inverter.

Max power point range

The maximum power point voltage of the solar panels is always above the lower limit of the inverter MPPT tracker. The maximum power point voltage of the solar panels is always below the upper limit of the inverter MPPT tracker.

Max Current

The maximum power point current of the solar panels is always below the maximum current for the inverter MPPT tracker.

Electrical

EcoFlow 5kW 1ph (2 MPPTs)

AC Isolator

A AC isolator - IMO - 32A 4-pole has been specified for this input

Current

The rated isolator current (32A) is greater than the rated inverter current (25.0A)

Phases

The isolator is suitable for use on a single phase inverter.

Input 01

DC Isolator

A IMO 25A DC Isolator 4-pole 2-string has been specified for this input

Current

The isolator is rated for a current of 20A, which is more than the expected maximum current of 17.81A.

Voltage

At 20A the isolator is rated for a voltage of 800V, which is more than the expected maximum voltage of 344.90V.

Cable

10m of 4mm2 solar cable has been specified

Voltage drop

Voltage drop at maximum power point at 40°C will be around **1.20 V (0.51 percent)**

Input 11

DC Isolator

A IMO 25A DC Isolator 4-pole 2-string has been specified for this input

Current

The isolator is rated for a current of 20A, which is more than the expected maximum current of 17.81A.

Voltage

At 20A the isolator is rated for a voltage of 800V, which is more than the expected maximum voltage of 443.45V.

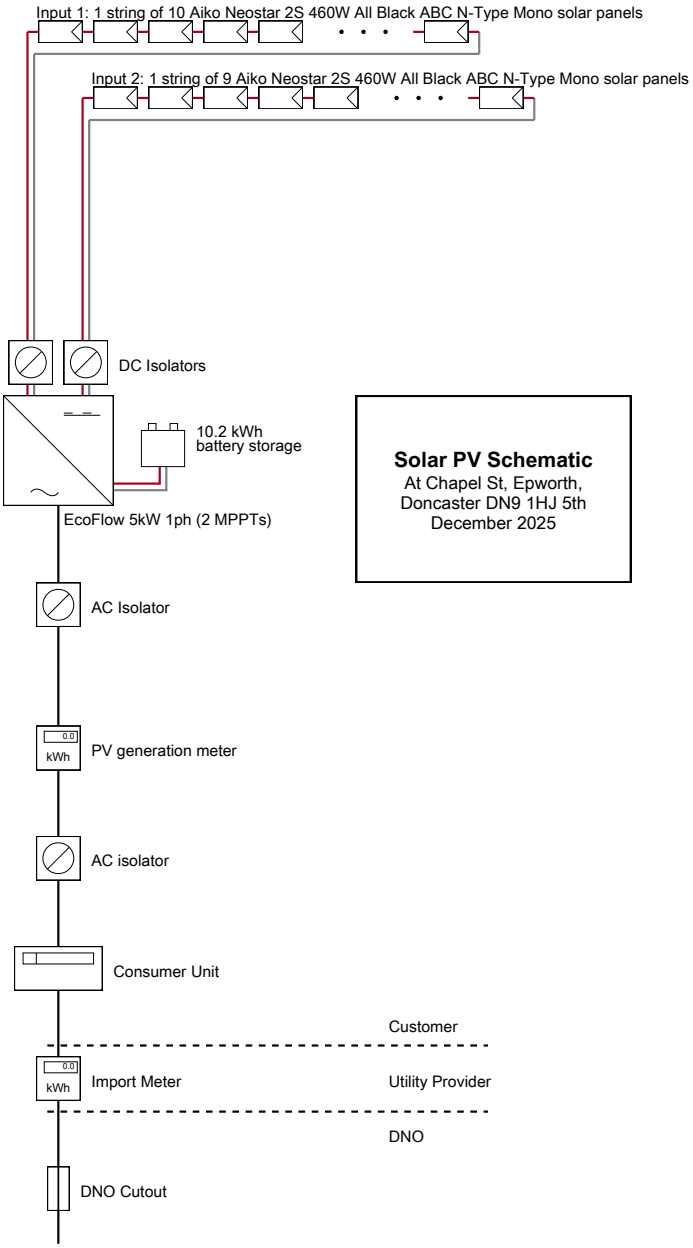
Cable

10m of 4mm2 solar cable has been specified

Voltage drop

Voltage drop at maximum power point at 40°C will be around **1.20 V (0.40 percent)**

Schematic diagram



Performance Estimate

Site details

Client

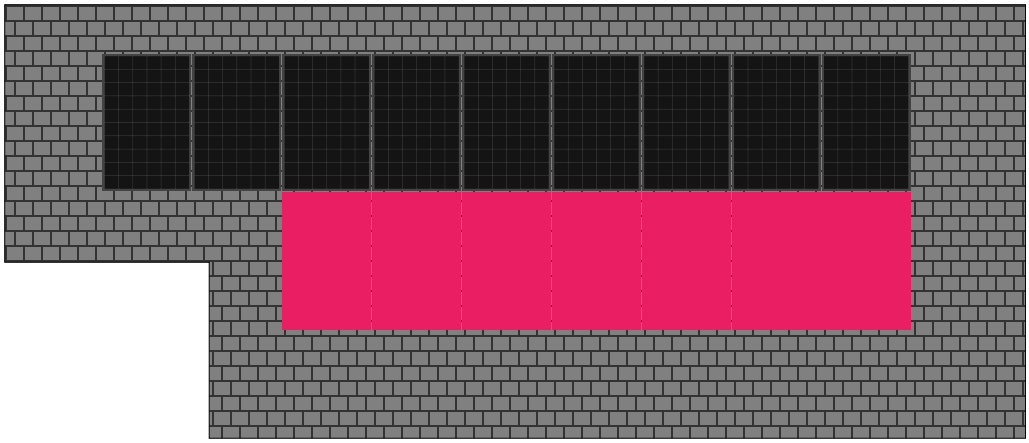
Address Chapel St, Epworth, Doncaster

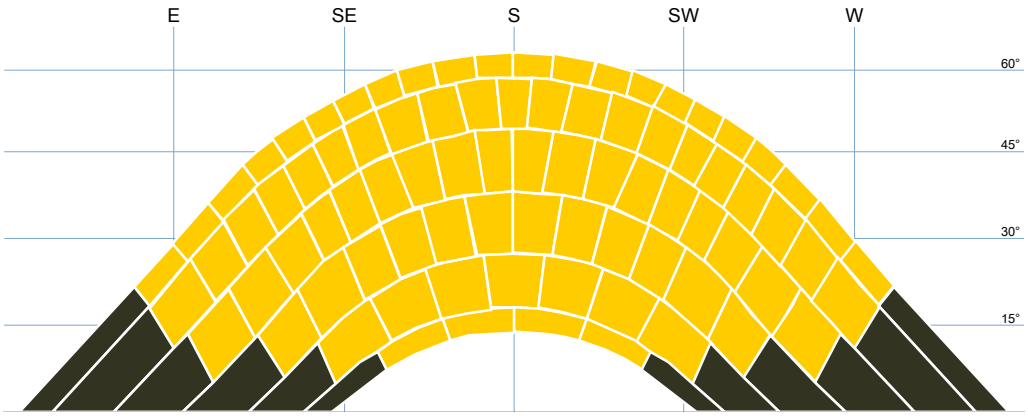
The sunpath diagram shows the arcs of the sky that the sun passes through at different times of the day and year as yellow blocks. The shaded area indicates the horizon as seen from the location of the solar array. Where objects on the horizon are within 10m of the array, an added semi-circle is drawn to represent the increased shading. Blocks of the sky that are shaded by objects on the horizon are coloured red, and a shading factor is calculated from the number of red blocks. The performance of the solar array is calculated by multiplying the size of the array (kWp) by the shading factor (sf) and a site correction factor (kk), taken from tables which take account of the geographical location, orientation and inclination of the array.

Inverter 1

EcoFlow 5kW 1ph (2 MPPTs)

String 1 -Shading group 1

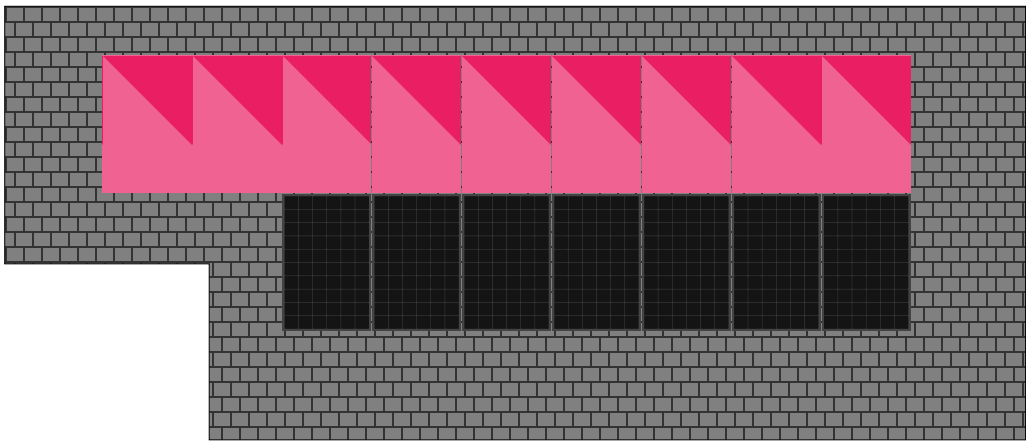


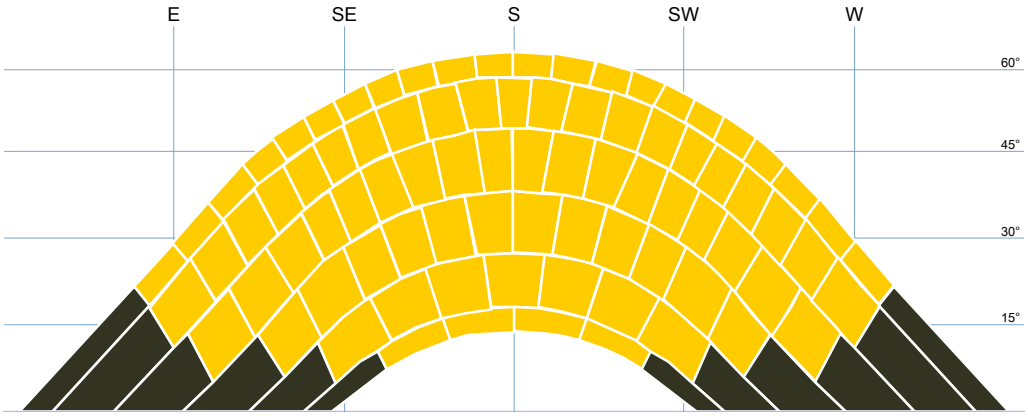


A. Installation data		
Installed capacity of PV system – kWp (stc)	**3.220**	kWp
Orientation of the PV system – degrees from South	**-84**	°
Inclination of system – degrees from horizontal	**30**	°
Postcode region	**11**	

B. Performance calculations		
kWh/kWp (Kk)	**736**	kWh/kWp
Shade factor (SF)	**1.00**	
Estimated output (kWp × Kk × SF)	**2370**	kWh

String 2 -Shading group 1





A. Installation data		
Installed capacity of PV system – kWp (stc)	**4.140**	kWp
Orientation of the PV system – degrees from South	**-84**	°
Inclination of system – degrees from horizontal	**30**	°
Postcode region	**11**	

B. Performance calculations		
kWh/kWp (Kk)	**736**	kWh/kWp
Shade factor (SF)	**1.00**	
Estimated output (kWp × Kk × SF)	**3047**	kWh

Performance Summary

A. Installation data		
Installed capacity of PV system – kWp (stc)	**7.360**	kWp
Orientation of the PV system – degrees from South	**See individual inputs**	
Inclination of system – degrees from horizontal	**See individual inputs**	
Postcode region	**11**	
B. Performance calculations		
kWh/kWp (Kk)	**See individual inputs**	
Shade factor (SF)	**See individual inputs**	
Estimated output (kWp × Kk × SF)	**5417**	kWh

Self consumption

We model here the performance of a solar PV system with battery storage over the course of a year, using high resolution minute-by-minute generation data for a typical PV system and consumption data for a typical house, and calculating the flow of energy from the solar panels to the house and the battery during the day, and from the storage battery back to the house at night – or from the grid to the house when the battery is empty or loads exceed the discharge capacity of the system.

We provide yearly profiles of generation, consumption, import / export and battery utilisation, along with detailed profiles for a typical spring day.

Battery system specification

EcoFlow 5kW 1ph (2 MPPTs) Inverter with 2× EcoFlow Power Ocean LFP 5kWh Batteries

Charge rate is directly taken from the inverter specification; this value can be less depending on the type of battery connected.

Charge rate	**5000 W**
Inverter charge efficiency	**96 %**
Inverter discharge efficiency	**96 %**
Battery efficiency	**95 %**
Round trip efficiency	**88 %**
Battery bank capacity	**10 kWh**
Max discharge depth	**95 %**
Usable capacity	**9.7 kWh**

Consumption

Electricity consumed in the property each year

3900 kWh

Generation

Electricity generated by the PV array each year

5410 kWh

Self consumption

Proportion of PV generation used in the property

52 %

Independence

Proportion of electricity consumption provided by PV

72 %

Import / Export

Electricity import / export each year from the property

1085 kWh / 2401 kWh

Utilisation

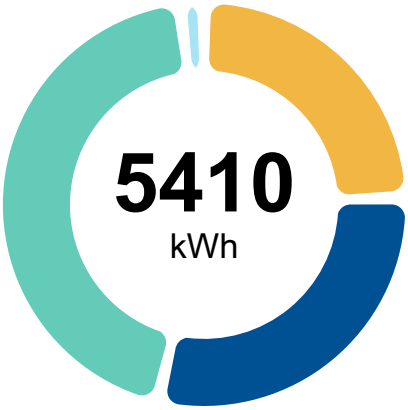
Average daily utilisation of the storage battery

45 %

Yearly generation

The solar PV array is expected to generate a maximum of 5410 kWh over a typical year. The graph shows whether the generated energy is used directly in the house, used to charge the storage battery, or exported to the grid.

24% (1321 kWh) of the electricity generated is expected to be used directly in the property. 31% (1688 kWh) is directed to the battery for later use, although 105 kWh of this is lost during battery charging, leaving 1583 kWh for use in the property. The remaining generation (2401 kWh, or 44% of the total) is exported to the grid.

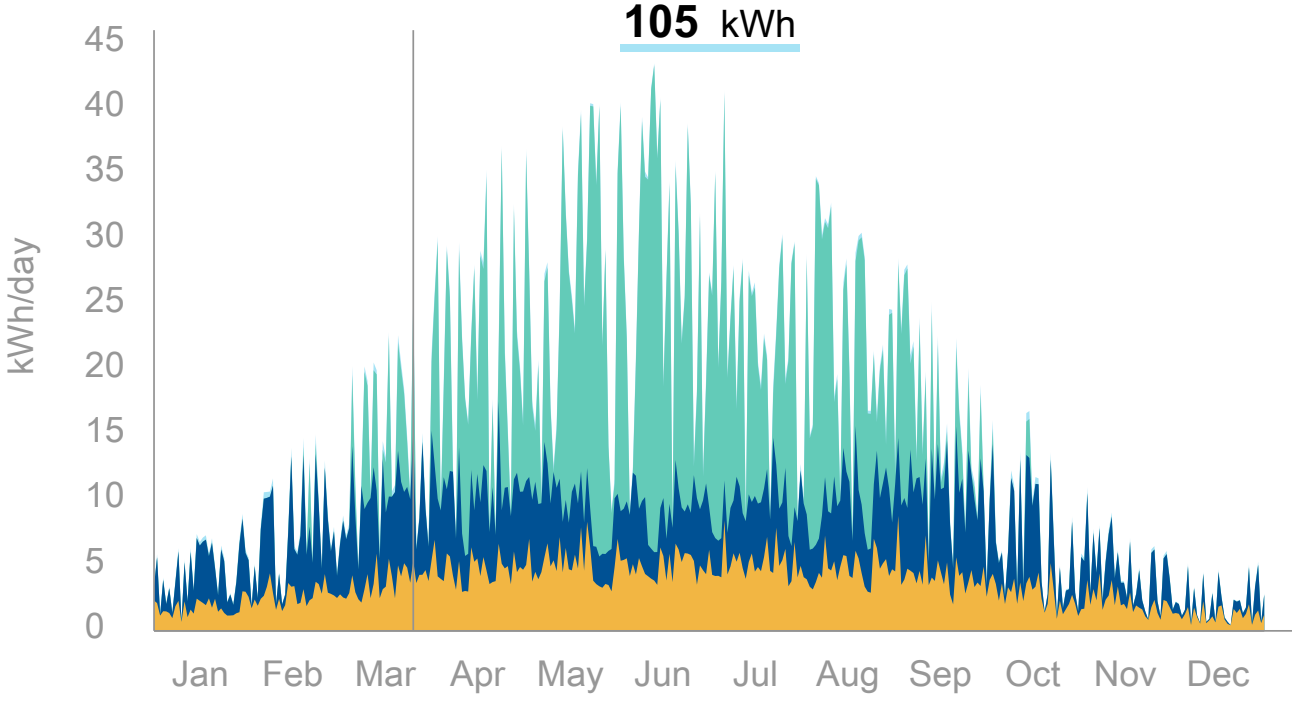


Direct use **1321** kWh

Via battery **1583** kWh

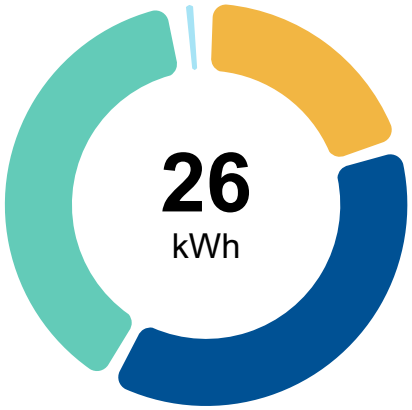
To grid **2401** kWh

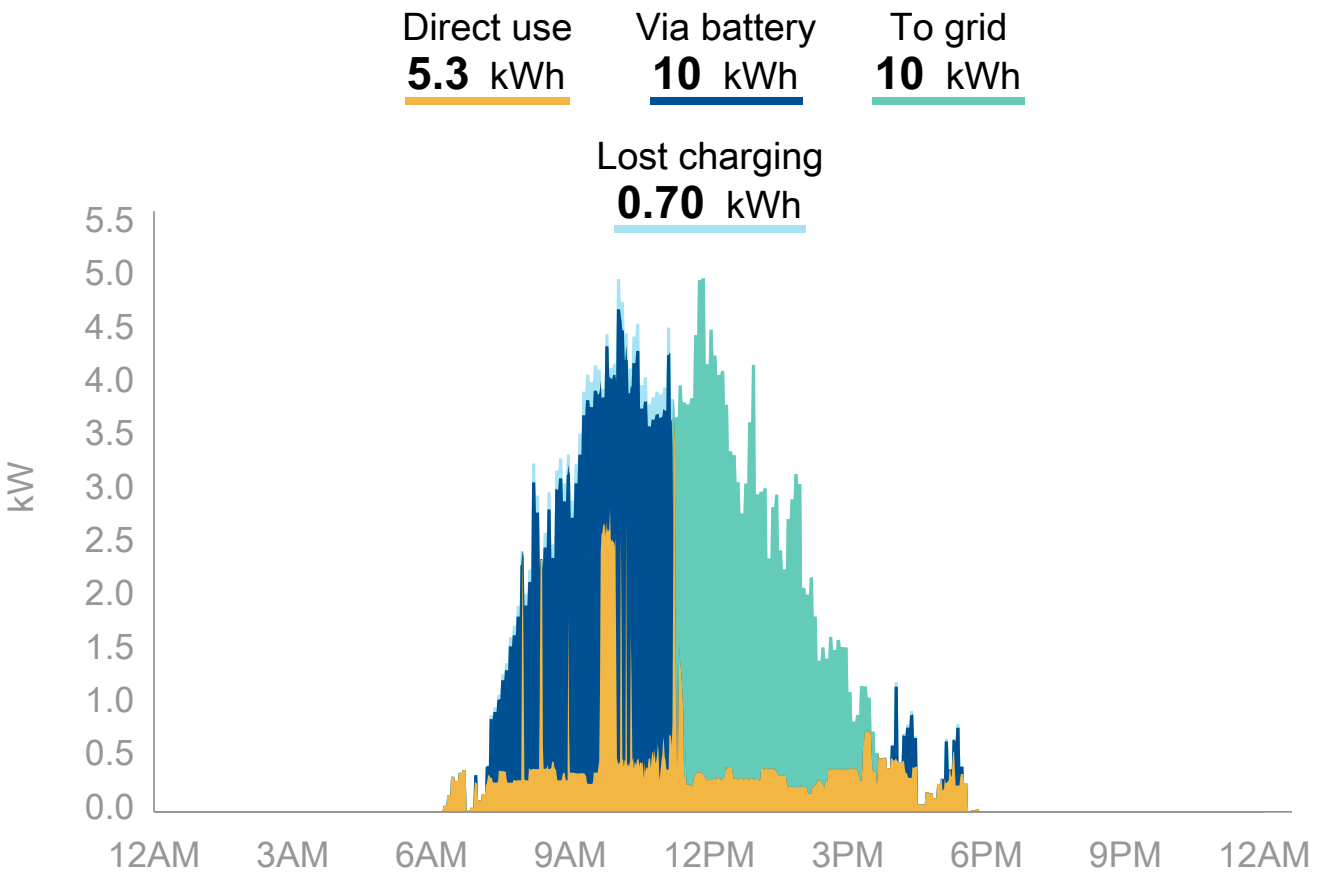
Lost charging **105** kWh



Daily generation

This graph shows the modelled profile of electricity generated by the PV array on a selected day (March 27th). On this day the PV system is expected to generate 26.3 kWh. Of this, 5.3 kWh (20%) is used directly in the property, 10 kWh (38%) is stored in the battery for later re-use, and 10.3 kWh (39%) is exported to the grid.

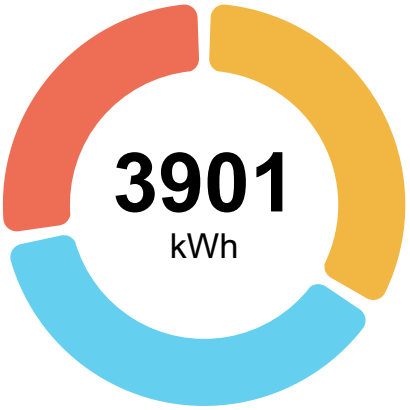




Yearly consumption

The property is expected to consume 3900 kWh of electricity each year. Around 34% of this (1321 kWh) is expected to be supplied directly by the solar array. Another 38% (1495 kWh) is supplied from the storage battery. The remaining 28% (1085 kWh) is supplied from the grid.

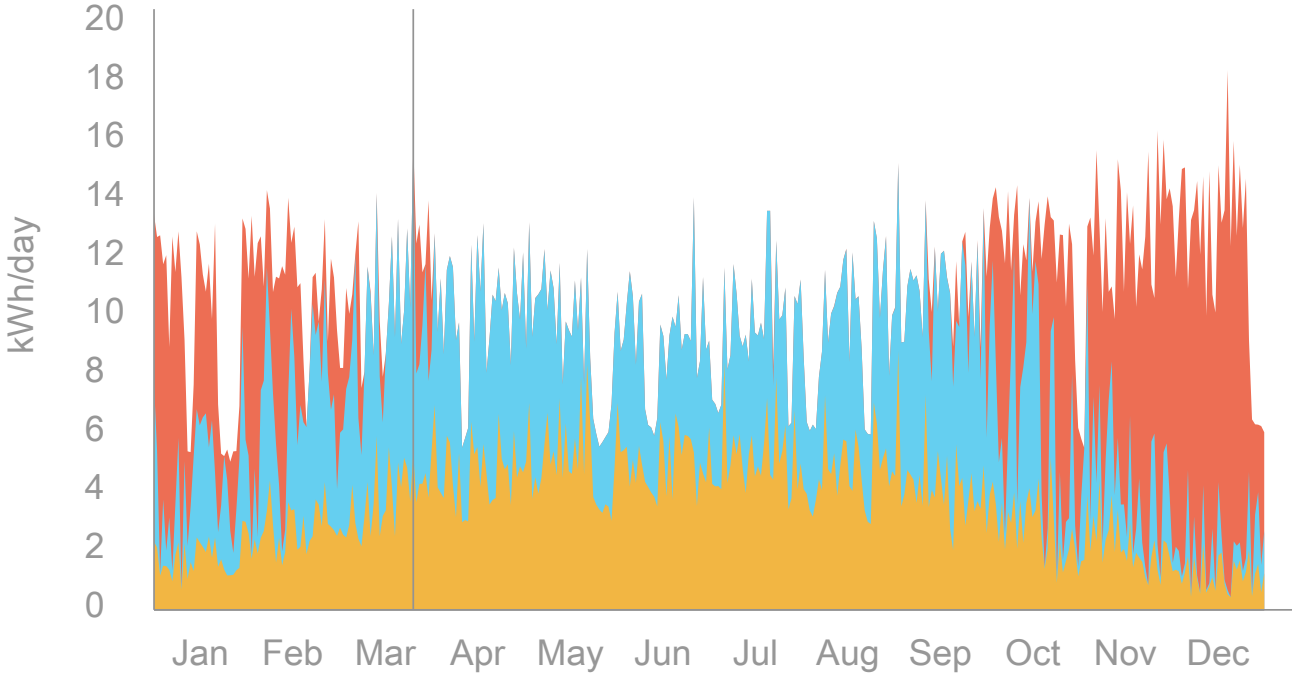
Overall, 72% (2816 kWh) of the electricity used in the property is expected to be supplied by the solar array and battery storage system. Without battery storage it would be 34% (1321 kWh).



From solar **1321** kWh

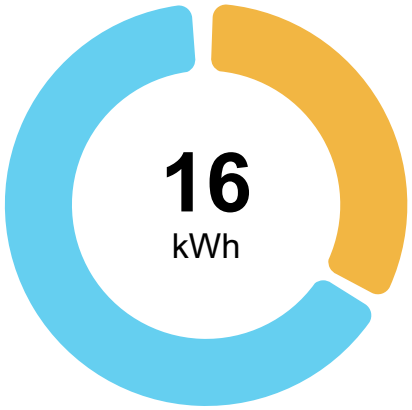
From battery **1495** kWh

From grid **1085** kWh



Daily consumption

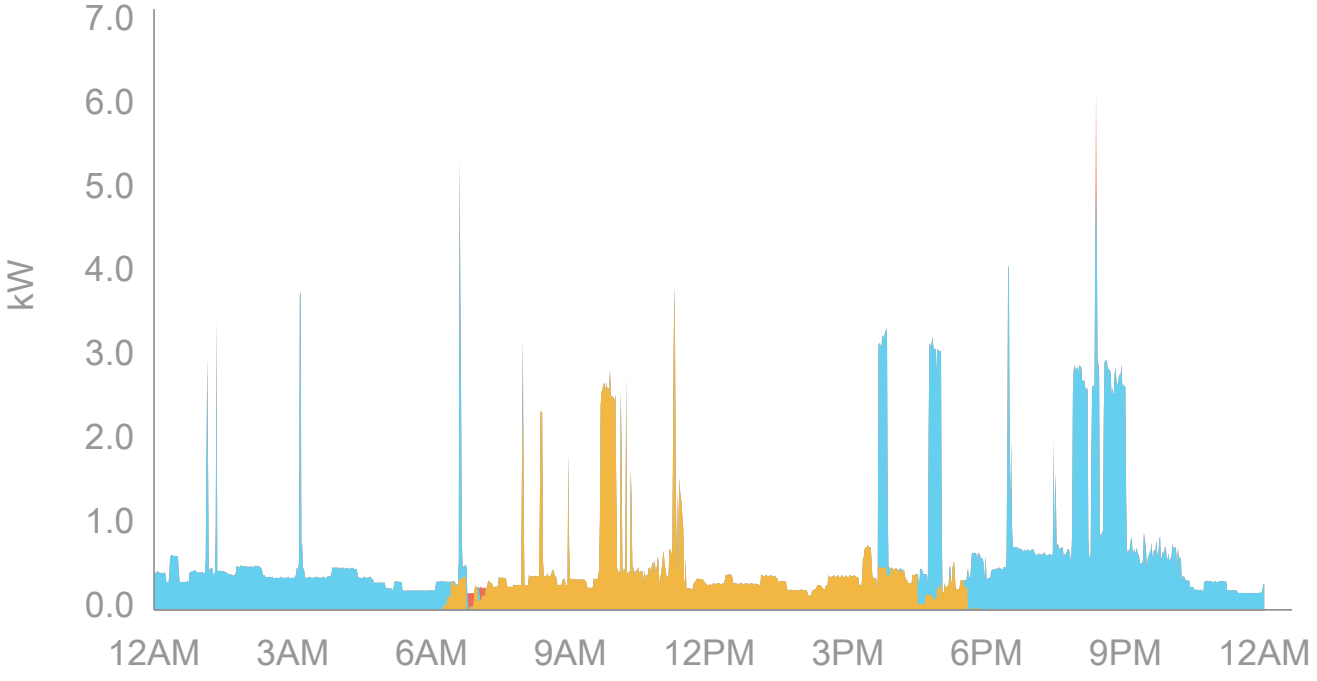
This graph shows modelled consumption data over the course of the selected day (March 27th). Total electricity consumption on this day was 15.9 kWh, of which 5.3 kWh (33%) is expected to be supplied directly by the solar array, and a further 10.5 kWh (66%) drawn from the battery storage system. The remaining 0.1 kWh (1%) is imported from the grid.



From solar **5.3** kWh

From battery **11** kWh

From grid **0.10** kWh



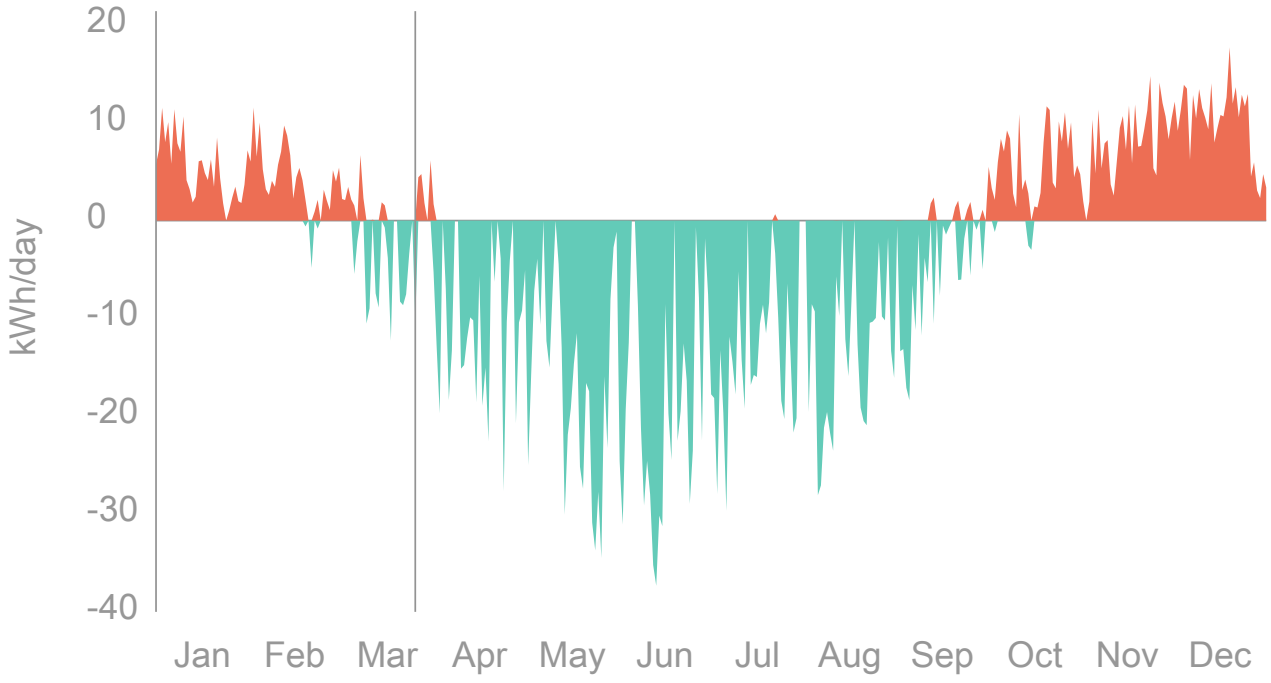
Yearly import and export

This graph shows modelled profiles of electricity imported and exported to and from the grid over the course of a year. The area above the horizontal axis represents imported electricity, and the area beneath the axis exported electricity.

Over the course of the year, a total of 1085 kWh is expected to be imported by the property, and 2401 kWh exported back to the grid.

Importing
1085 kWh

Exporting
2401 kWh

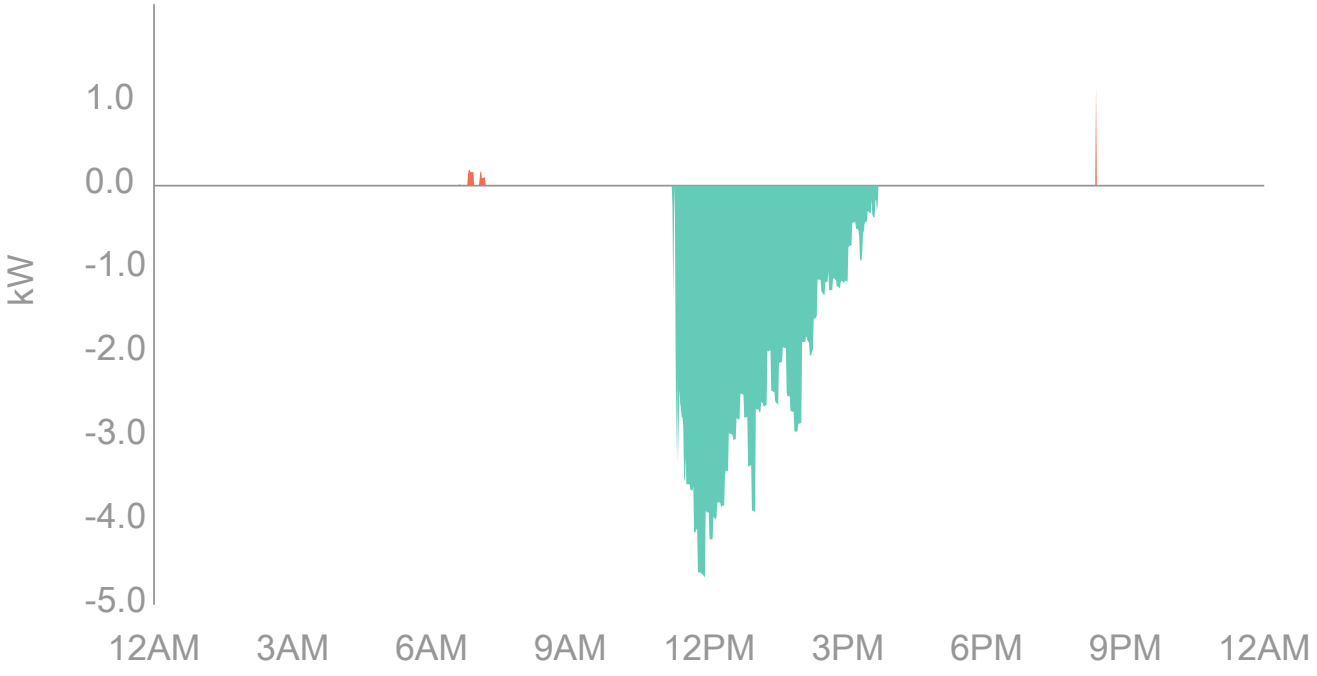


Daily import and export

This graph shows the modelled import and export of electricity over a selected day (March 27th). On this day 0.1 kWh is expected to be imported from the grid, and 10.3 kWh exported. At times when no import or export is shown the battery storage system is charging or discharging.

Importing
0.10 kWh

Exporting
10 kWh



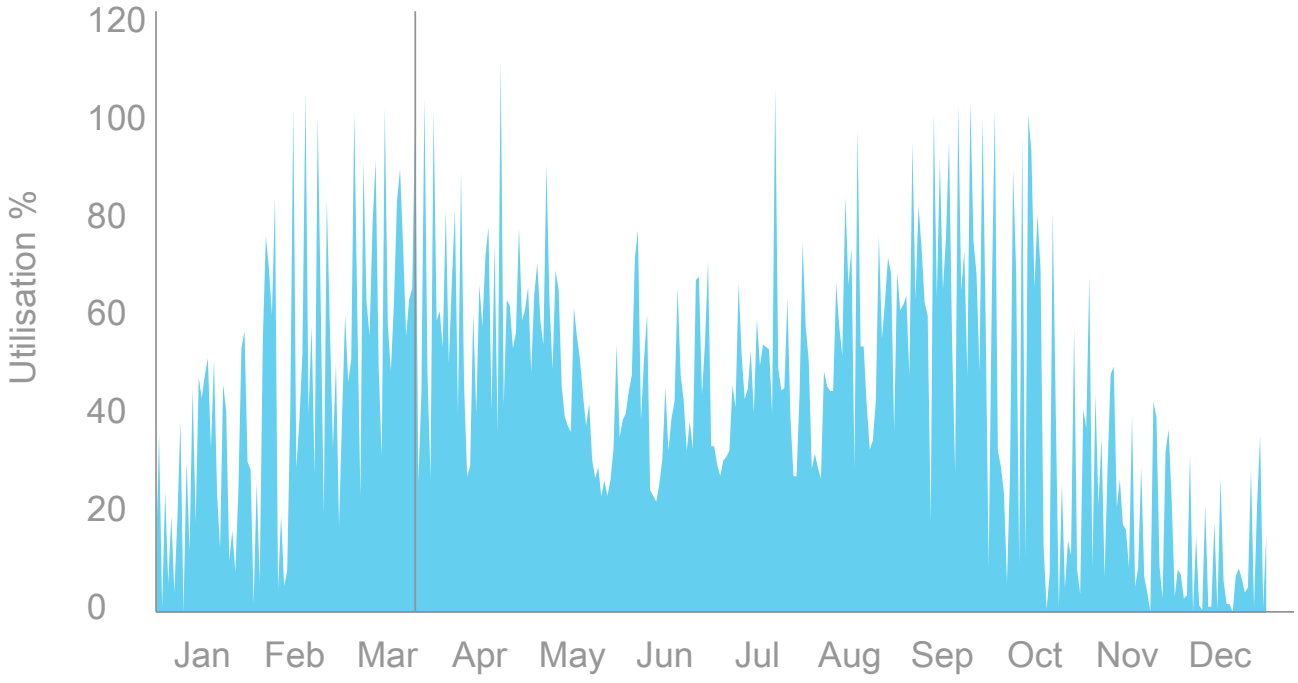
Yearly battery utilisation

The graph shows the modelled utilisation of the battery over the course of the year – the fraction of the available battery capacity that is actually charged and discharged each day. Utilisation of over 100% is possible at times where a battery is charged and discharged more than once during a day.

Low battery utilisation can be due to either insufficient spare PV generation to charge the battery (often the case in winter, or on cloudy days), or because loads are small overnight and the battery does not fully discharge.

45%

Avg Battery Utilisation

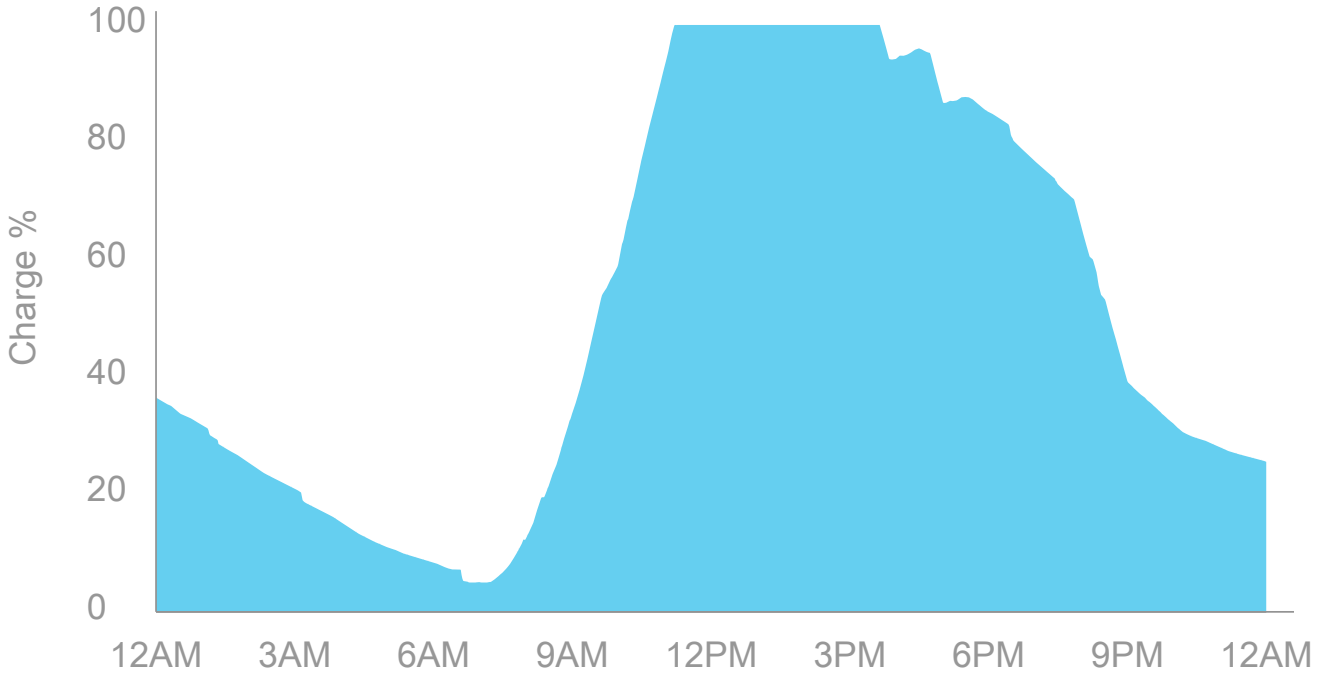


Daily battery utilisation

The state of charge of the battery over a selected day (March 27th) is shown in the graph below. The battery discharges overnight or when there is heavy demand during the day, and charges when there is excess solar PV generation during the day. On this day, 103.4% of the battery capacity was utilised.

103%

Avg Battery Utilisation



Equipment and Services

Equipment Costs

8.74kW PV system comprising 19 AIKO 460W solar panels, a single phase EcoFlow Power Ocean inverter and 2 x 5.1kWh of battery storage	

Services Costs

Totals

Total before tax	**£0.00**
VAT at 0%	**£0.00**
Total including tax	**£0.00**

Financial

Generation

The system is expected to generate 5417 kWh per year initially, decreasing gradually as the solar cells degrade. Over the 25 year term of this financial projection the total generation is expected to be 127284 kwh, of which 69099 kWh will be consumed on site and 53272 kWh exported.

127 MWh

Payback

After adjusting projected costs and benefits for inflation, and applying a discount rate of 4%, the initial system cost of £0.00 is expected to be recouped after 0 years.

0 years

Net Present Value

The total present value of future benefits and costs, using a discount rate of 4% per year, is £23,068.37. The cost of the PV system is £0.00. The net present value of the project is therefore £23,068.37. A positive net present value is a good indication that the project is financially worthwhile.

£23,068.37

IRR

The Internal Rate of Return is a useful measure for comparing the relative profitability of investments.

69.3 %

Disclaimer

Our financial model calculates the benefits of a solar PV installation (such as savings in electricity, or payments for exported electricity) and costs (the initial purchase cost, and any future maintenance costs if entered), over the projected lifespan of the system. Values are corrected for inflation, system degradation, and discount rate - a measure that accounts for the fact that a promise of a monetary sum in the distant future is usually considered less valuable than the promise of the same sum in the near future.

A model is only as accurate as the assumptions it makes. You should consider whether the values chosen are appropriate for your situation. There are many variables that dictate the financial return of a solar installation and we cannot forecast how they may change in the future. This financial projection shows a likely scenario for future financial returns. Actual returns may vary significantly from this forecast.

Assumptions

Inflation rate	**3.5%**
Cost of electricity	**24.50 p/kWh** increases with inflation
System size	**7.36 kWp** degrades at 0.5% per year
Discount rate	**4%**
Projection length	**25 years**

Income and savings

The projected income from the system over the project lifetime in payments for generated and exported electricity, along with electricity savings, are shown in the table and graph below.

These figures assume an inflation rate of 3.5 percent.

£12,449

Total Export Payments

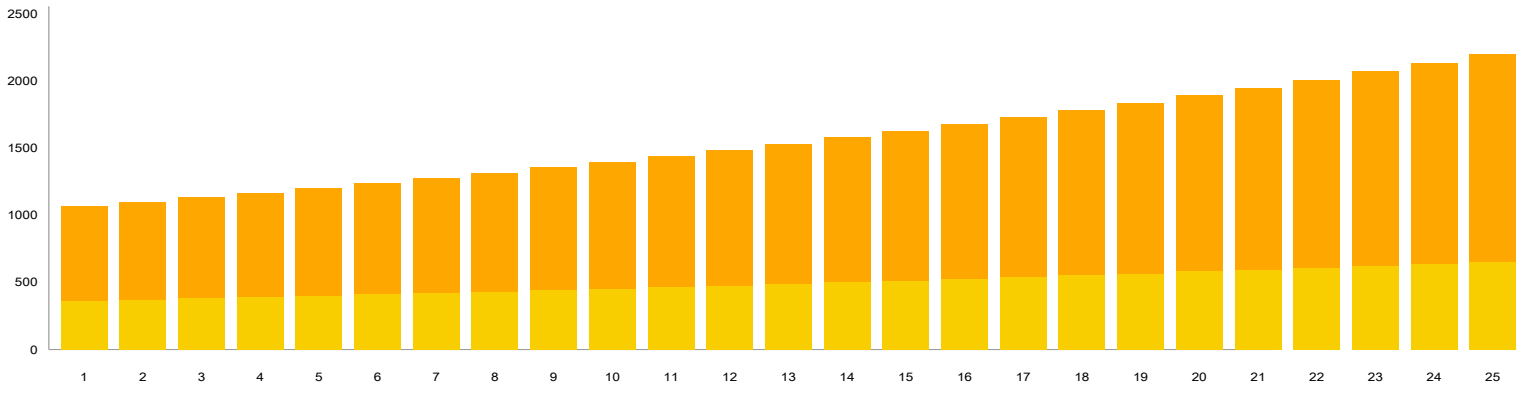
over 25 years

£26,776

Electricity savings

over 25 years

	Export payments	Electricity savings	**Total**
Year 1	365	701	**1066**
Year 2	374	725	**1099**
Year 3	383	749	**1132**
Year 4	393	774	**1167**
Year 5	403	800	**1203**
Year 6	413	827	**1240**
Year 7	423	855	**1278**
Year 8	433	883	**1317**
Year 9	444	913	**1357**
Year 10	455	944	**1399**
Year 11	467	975	**1442**
Year 12	478	1008	**1486**
Year 13	490	1042	**1532**
Year 14	502	1077	**1579**
Year 15	515	1113	**1628**
Year 16	528	1150	**1678**
Year 17	541	1188	**1729**
Year 18	554	1228	**1782**
Year 19	568	1269	**1837**
Year 20	582	1311	**1894**
Year 21	597	1355	**1952**
Year 22	612	1400	**2012**
Year 23	627	1447	**2074**
Year 24	643	1496	**2138**
Year 25	659	1545	**2204**

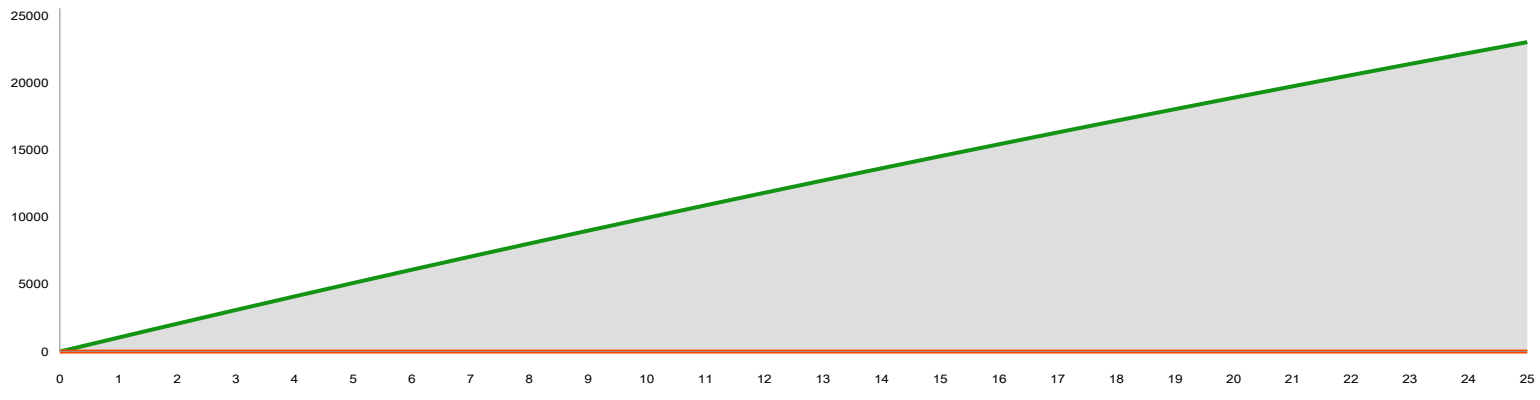


The bottom line

The table and graph below show the discounted costs for the project (including the initial capital required for the installation), against the total discounted benefits from income and savings on electricity bills.

The system does not pay for itself in the 25 years of this financial projection.

	Discounted benefits	Cumulative benefits	Discounted costs	Cumulative costs	**Cashflow**
Year 1	1045	1045	0	0	**1045**
Year 2	1034	2079	0	0	**2079**
Year 3	1023	3101	0	0	**3101**
Year 4	1012	4113	0	0	**4113**
Year 5	1001	5114	0	0	**5114**
Year 6	991	6105	0	0	**6105**
Year 7	980	7085	0	0	**7085**
Year 8	970	8055	0	0	**8055**
Year 9	960	9015	0	0	**9015**
Year 10	949	9964	0	0	**9964**
Year 11	939	10904	0	0	**10904**
Year 12	930	11833	0	0	**11833**
Year 13	920	12753	0	0	**12753**
Year 14	910	13663	0	0	**13663**
Year 15	901	14564	0	0	**14564**
Year 16	891	15455	0	0	**15455**
Year 17	882	16337	0	0	**16337**
Year 18	873	17210	0	0	**17210**
Year 19	864	18073	0	0	**18073**
Year 20	855	18928	0	0	**18928**
Year 21	846	19773	0	0	**19773**
Year 22	837	20610	0	0	**20610**
Year 23	828	21438	0	0	**21438**
Year 24	819	22257	0	0	**22257**
Year 25	811	23068	0	0	**23068**




GUTTER