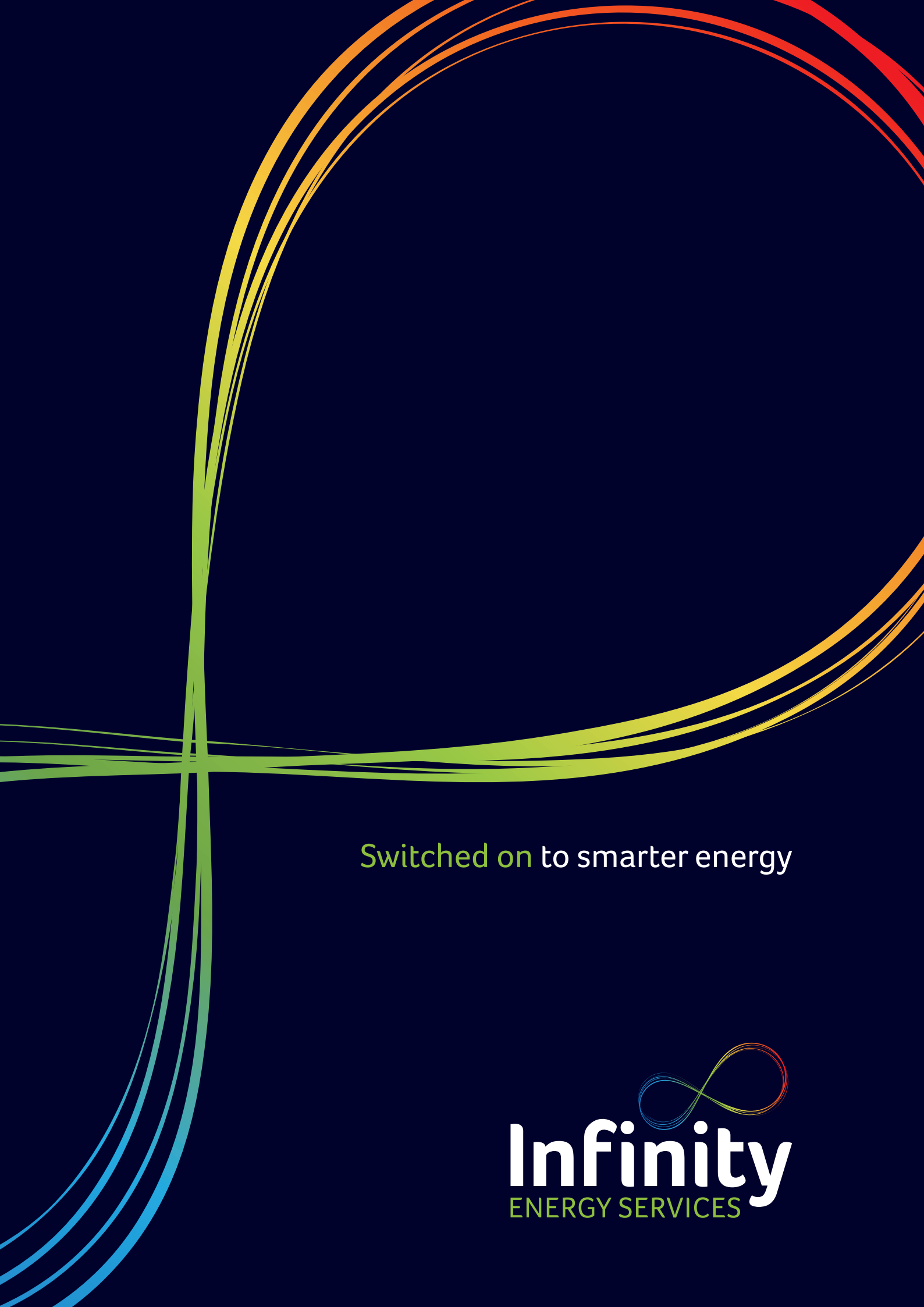
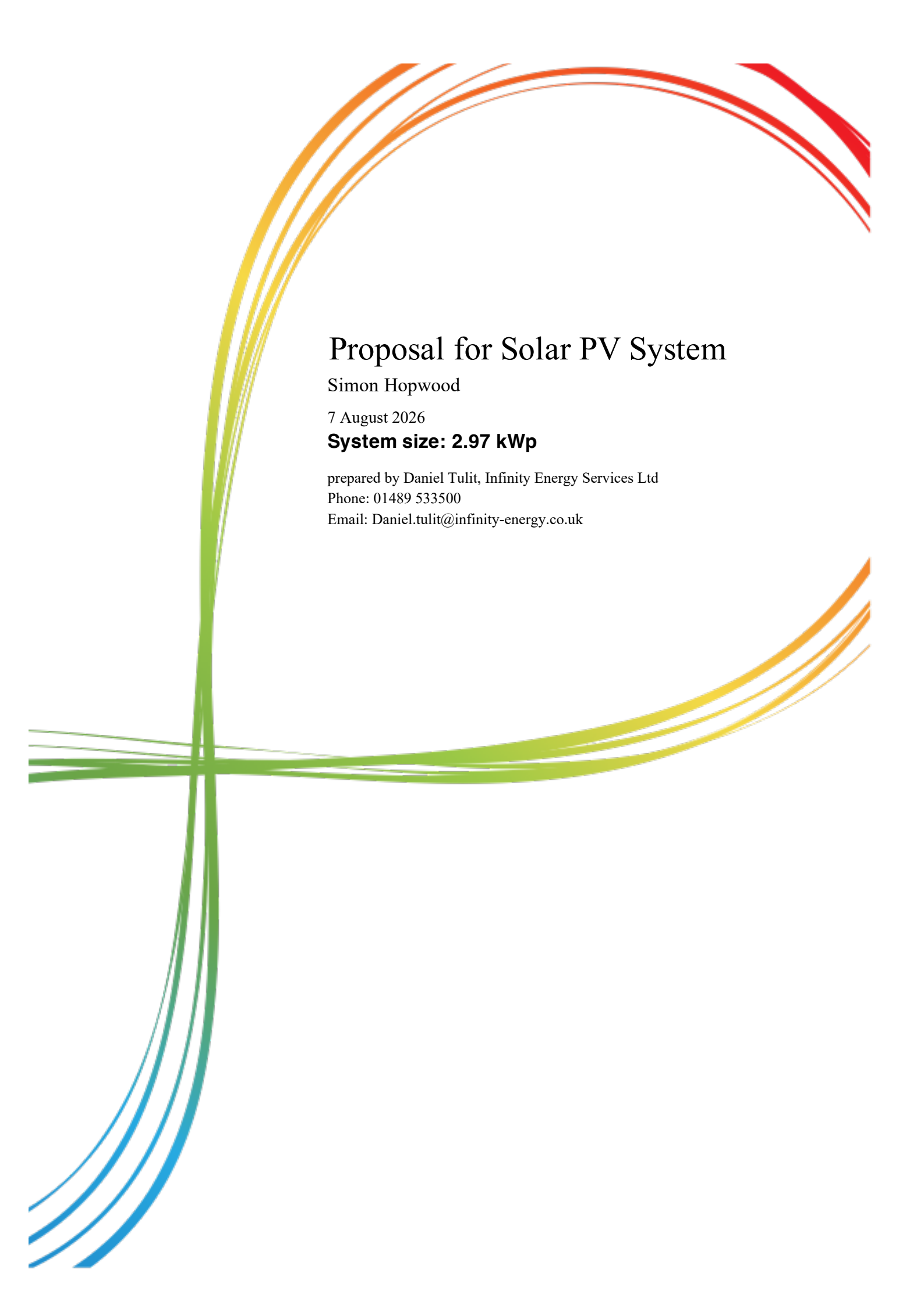




Switched on to smarter energy



Infinity
ENERGY SERVICES



Proposal for Solar PV System

Simon Hopwood

7 August 2026

System size: 2.97 kWp

prepared by Daniel Tult, Infinity Energy Services Ltd

Phone: 01489 533500

Email: Daniel.tult@infinity-energy.co.uk

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Proposal Summary

Total Solar Panel System Size

Peak solar output

2.97kW



Total Cost for All Equipment

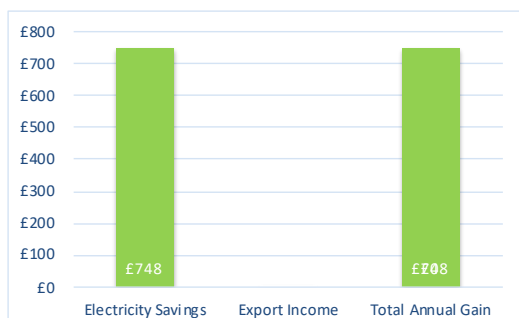
Supplied and installed

£10,540 (no VAT)



Annual Savings & Income

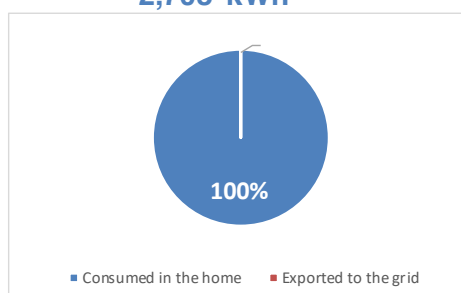
How you save money with solar



Where Does my Solar Electricity Go?

Total annual electricity generation

2,703 kWh



Payback Period



Next Steps

Above is a summary of the key points of your solar panel proposal. If you have any immediate questions, please call us now on 0800 909 8882.

In the pages that follow, you will find a very comprehensive proposal, carefully tailored to match your specific situation and needs. If any of the points are unclear, do not hesitate to get in touch.

Are you getting other quotes? If so, we can help compare and contrast equipment and warranties, to ensure you end up

Design Overview

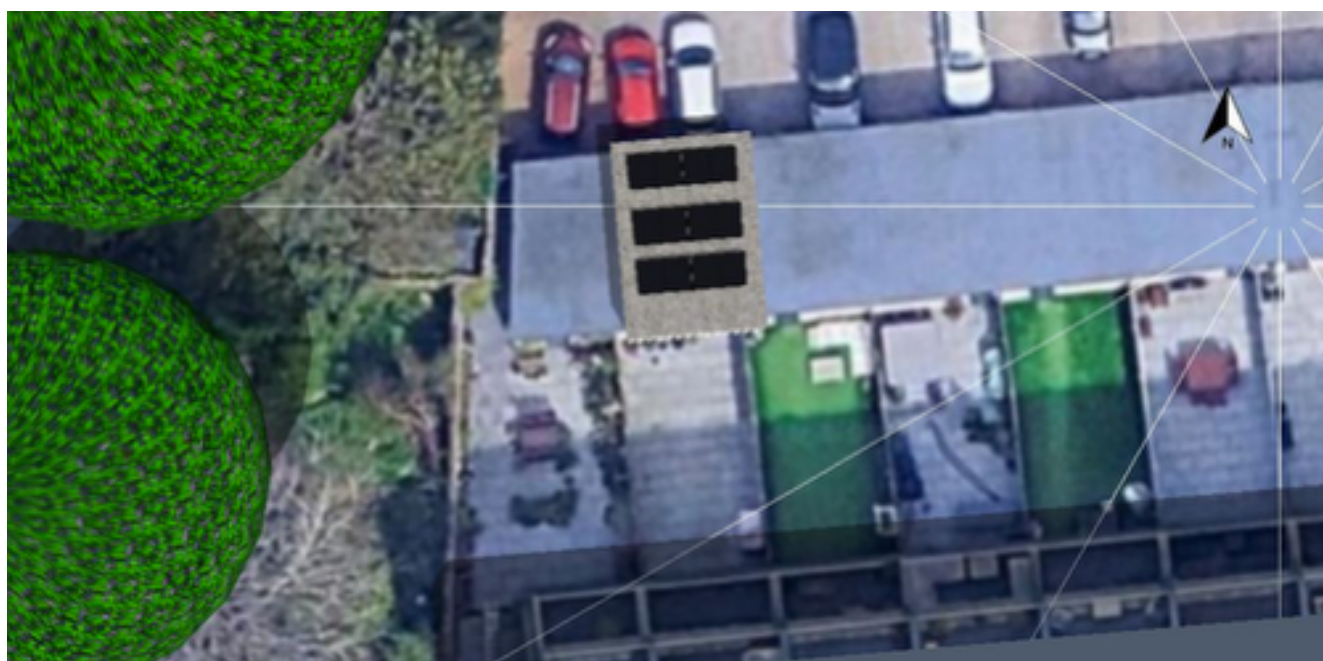
Further to my survey of your home, we have produced this report for a suitable solar PV and battery system.

We recreated your roof in our solar CAD software. In addition to the 3D functionality, these CAD software also: a) Pulls in weather data from a local weather station, in order to improve the accuracy of its prediction of how much electricity your solar panel system will produce; b) Knows your exact location on the map, in particular the latitude, which dictates how much sun you are exposed to throughout the year; and c) Incorporates other relevant inputs such as your energy demand profile, how much you pay per unit for your electricity, any shading objects, and so on. You will find the full design report, together with visualisations, in the Appendix.

We have placed 6 'all black' solar panels on your South-facing roof (see graphic below). These are 495W panels made by SunPower and further panel details can be found on page 4 and in the data-sheet in the Appendix. This creates a 2.97 kWp solar panel system.

We then connect the panels to a 5 kW hybrid inverter made by Fox ESS. Full details about the choice and importance of the inverter can be found on page 4, and a data-sheet is in the Appendix.

We have included 2 x Fox ESS EP12 Batteries which have 23.04 kWh of useable storage, the data-sheets for these systems are included in the Appendix.



System Components, Project Costs & Benefits

Equipment to be installed:

6 x SunPower M Class 495W N-Type Back contact solar panels
 Van der Valk ValkPro + L10 South flat roof/ground mount system
 1 x Fox 5kW hybrid solar inverter
 2 x Fox Battery EP12
 If on-roof, 1 x bird/rodent protection kit
 All DC and AC isolators, cabling, trunking, etc.

Included in the Price:

Roofing labour
 Electrical labour
 Scaffolding and access equipment
 MCS Certificate
 6-year insured workmanship warranty (solar installation)
 Grid connection notification

Project Cost Summary: Price valid up to 30 days and subject to survey

Our total fee, including all of the above, is: £10,540.00 (no VAT to pay)

* Please note: if you are paying through a business, we need to apply 20% VAT to the prices above.

* Please note we expect wifi on the location of equipment and full mains supply in place.

Predicted Savings & Income:

Electricity bill saving by using solar electricity directly in the home	
and bill saving from storing solar electricity in a battery:	£748 per year
Bill saving from diverting solar electricity to heat your water:	£0 per year
Electricity bill saving from charging your EV with solar electricity :	£0 per year
Income from the Smart Export Guaranteed(see page 7):	£0 per year

Total Annual Gain: £748 per year
Estimated Payback Time: 10.3 Years
 (Based on 7.5% energy price inflation)

Assumptions:

Overall solar array system size:	2.97 kWp	
The price you currently pay for your electricity:	27.6900 p	
The amount of electricity you need per year:	8,010 kWh	
The total amount of solar electricity that will be generated per year:	2,703 kWh	100 %
Electricity bill saving by using solar electricity directly in the home		
and bill saving from storing solar electricity in a battery:	2,703 kWh	100 %
Bill saving from diverting solar electricity to heat your water:	0 kWh	0 %
Electricity bill saving from charging your EV with solar electricity :	0 kWh	0 %
Solar electricity exported to the grid:	0 kWh	0 %
Solar Fraction – how much of your total energy bill will met by solar:	34 %	
Smart Export Guarantee Rate(assumed – see page 7):	12 p	

Solar Panels & Mounting System

Solar photovoltaic (PV) panels convert sunlight into electricity. The type of electricity produced is known as Direct Current or 'DC'.

Often with technological solutions, 'ROI' and 'quality' are mutually exclusive – you can have one or the other, but not both. This maxim used to be true in the world of solar as well. Nowadays, due to mass production of solar panels in brand new, gleaming factories in Asia, and with the financial muscle of huge conglomerates behind R&D and after-care, you can secure very high quality equipment, at a keen price, in the knowledge that were the worst to happen, the warranty will be backed up in full, far into the future.

We have access to all the solar panels currently available in the UK market and continually assess the key factors such as price, build quality, efficiency, warranty, manufacturer size, UK support, and so on. At the moment, for your project, we recommend the following panel:

Manufacturer: SunPower M Class
Panel Rating: 495W
Type of Silicon: N-Type Back contact
Product Warranty: 40 years
Model Number: SPR-BE54-DC495-

Number of Panels: 6
Solar PV System Size: 2.97 kWp



SunPower panels are the best on the market, with the highest efficiency ratings, lowest degradation over time as well as having the most comprehensive warranty of all the panels we offer. Their panels are manufactured in Malaysia, the Philippines, Mexico and France.

The company that makes these panels is SunPower Corporation, the world's premier solar panel manufacturer, recognised for its extremely high-quality, high-efficiency solar cells and panels. These have very little degradation over time compared to other panels on the market and also come with the longest service warranty. SunPower's headquarters are based in California, USA.

We work with all the major **mounting system** manufacturers. For your installation, we recommend:

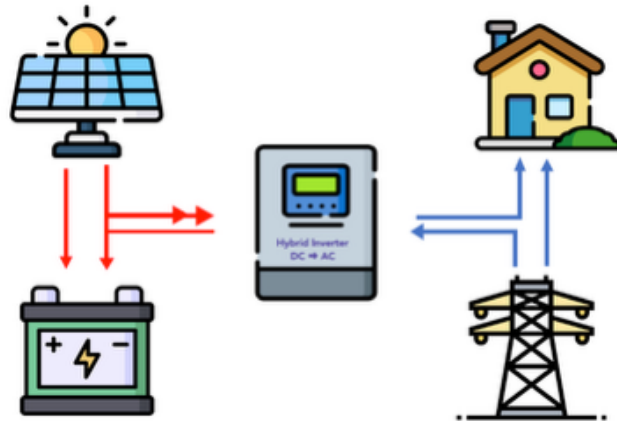
Manufacturer: Van der Valk
Type: flat roof/ground mount system
System: ValkPro + L10 South
Country of Manufacture: Netherlands
Product Warranty: 10 years



Inverter

The solar panels are then connected to an **inverter**. The inverter converts the DC electricity from the panels into Alternating Current or 'AC' electricity which can then be used to power devices, lighting, etc.

For the solar PV system size mentioned on the previous page, we recommend the following inverter:



Manufacturer:	Fox
Inverter Rating:	5kW
Model:	FE-H1-5 G2
Warranty:	10 years
Number of Inverters:	1
Total Inverter Capacity:	5kW



You can find a data-sheet of the inverter in the Appendix.

The total inverter capacity in kW is usually less than the total 'peak' solar panel capacity in kWp. This is because solar panels only reach their peak, or full, output capacity when the sun shines at exactly 90 degrees to the panel surface and in ideal temperature conditions. For most of the year, and at most times of the day, solar panels do not output at their full rated capacity. For this reason, inverters are often 'under-sized' in relation to the solar panels – basically it helps the whole electricity generation system run more efficiently.

The Fox ESS battery system in the UK features their proprietary inverters, batteries, and a cutting-edge control and monitoring platform, delivering an outstanding energy storage solution. The Fox ESS monitoring platform and applications are some of the most advanced on the market, ensuring full readiness for energy flexibility services and optimal performance.

Optional Extras

Certain devices can complement a solar PV array (see below). Please let us know if you are interested in any of these.

Heat your water with solar electricity

If you have an immersion heater in your water tank, you can heat your water for free with excess solar electricity.

There are various devices on the market, and the one we recommend is the Solar iBoost. It's relatively inexpensive and easy to install.



Manufacturer

Marlec

Model

Solar iBoost

Charge Rate

3 kW

Warranty

2 years

The iBoost is fitted in your airing cupboard next to the immersion. We then install a clamp/ transmitter where the main electricity cable comes into your home. When the clamp senses you have surplus solar electricity, it turns your immersion on and, hey presto, you get free hot water.

Charge your electric car with sunshine

Solar electricity is also the most environmentally friendly way of charging an electric car.

If you already have an electric car – or are thinking you might get one in the future – we recommend a 'smart' home chargepoint like the Zappi.

The Zappi has a setting that guarantees you can charge your car with free solar electricity only, if you wish to. It also allows you to make use of cheap, overnight tariffs, such as Octopus Go.



Manufacturer

MyEnergi

Model

Zappi, Type 2

Charge Rate

7 kW

Warranty

3 years

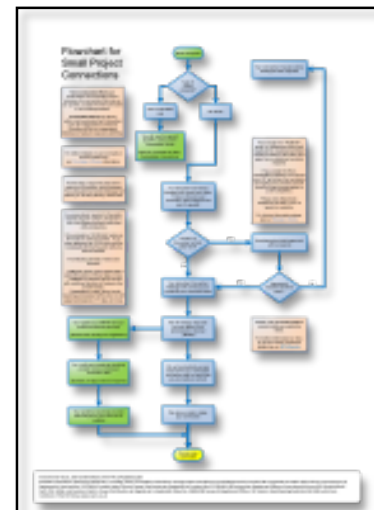
Grid Application & Smart Export Guarantee

Grid Application

In order to connect solar inverters greater than 3.68 kW on a single phase to the national grid, you need prior permission from the local electricity company, known as the 'DNO'.

Your total inverter capacity is:
5kW

Per phase, if your inverter size is greater than 3.68 kW or you have a Tesla Powerwall/PureDrive 5kW export, an application to the DNO is required. This process will take 8-9 weeks and we will undertake all the paperwork.



Smart Export Guarantee

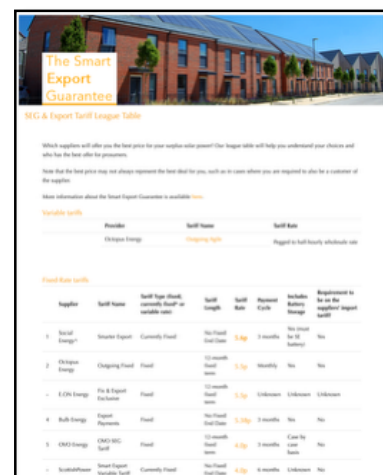
The Smart Export Guarantee (SEG) scheme started on 1 January 2020.

Under the scheme, you are paid for every kWh (unit) of solar electricity you export to the grid.

To access the SEG, **you must sign up directly with a participating energy supplier** and have a suitable smart meter installed (free of charge). The possibility of installing a smart meter in your area will need to be confirmed with your electricity supplier.

The rate you are paid per kWh varies from supplier to supplier. **Please note: Infinity Energy does not arrange or manage your SEG application — it is entirely the customer's responsibility to organise this with their chosen supplier.**

At the moment, we recommend Octopus Energy, which pays 12p per kWh on its Outgoing Fixed tariff, but you would need to check with Octopus if you are eligible for this deal.



The Smart Export Guarantee
SEG & Export Tariff League Table

Which suppliers will offer you the best price for your system when you export? Our league table will help you understand your options and who has the best offer for producers.

Note that the best price may not always represent the best deal for you, such as in cases where you are required to also be a customer of the supplier.

More information about the Smart Export Guarantee is available [here](#).

Supplier	Tariff Name	Tariff Type (Fixed, Variable, or Variable with a Fixed Element)	Tariff Amount	Tariff Rate	Payment Cycle	Includes Smart Meter	Requirement to be a customer of the supplier
1. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes
2. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes
3. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes
4. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes
5. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes
6. Octopus Energy	Outgoing Fixed	Fixed	12p per kWh	5.4p	1 month	Yes	Yes

Roof Structural Assessment & Planning Permission

Roof Structural Assessment

A typical solar panel weighs 22 kg and has a surface area of 1.9m². Each panel, together with the associated mounting equipment, will impose a load on your roof. It is highly likely your roof can easily tolerate this additional loading.

Nonetheless, we will carry out a structural analysis of your roof to guarantee the extra load is within tolerances.

Planning Permission

Most domestic solar panel installations do not require planning permission, as long as they are designed appropriately. The UK law in this area is as follows (taken from the government statutory instrument '2015 No. 596' which relates to the Town and Country Planning Act):

"A.1 Development is not permitted by Class A if—

(a) the solar PV or solar thermal equipment would protrude more than 0.2 metres beyond the plane of the wall or the roof slope when measured from the perpendicular with the external surface of the wall or roof slope;

(b) it would result in the highest part of the solar PV or solar thermal equipment being higher than the highest part of the roof (excluding any chimney);

(c) in the case of land within a conservation area or which is a World Heritage Site, the solar PV or solar thermal equipment would be installed on a wall which fronts a highway;

(d) the solar PV or solar thermal equipment would be installed on a site designated as a scheduled monument; or

(e) the solar PV or solar thermal equipment would be installed on a building within the curtilage of the dwellinghouse or block of flats if the dwellinghouse or block of flats is a listed building."

We have designed the system such that clauses (a), (b) and (c) are met in full. In addition, your house is not sited on a scheduled monument, therefore clause (d) does not apply.

It is our opinion, therefore, that planning permission is not required as long as your house is not listed or within the boundary of another listed building (clause (e)).

Ultimately, planning issues are the responsibility of the building owner and/or tenant, and independent advice should be sought in case of any doubt.

Accreditations, Warranties & References

Accreditations

We hold all the necessary accreditations to be able to install solar panel systems in the UK. These accreditations mean you are entitled to receive any subsidies that might be available, and also protect you as a consumer. Here are our certificate and membership numbers:

MCS Certificate Number:	NAP 14896
RECC / MCS Membership Number:	00048808



The Microgeneration Certification Scheme, **MCS**, certifies microgeneration products, such as solar panels, used to produce electricity and heat from renewable sources. MCS also certifies installation companies to ensure the microgeneration products have been installed and commissioned to the highest standard for the consumer.

As members of the Renewable Energy Consumer Code, **RECC**, we agree to abide by the Consumer Code. It covers all the factors that contribute to a high standard of consumer service, before, during and after a contract is agreed.

Warranties & Guarantees

The main components of the installation come with solid **product warranties** of at least 10 years. The exact product warranty lengths for the equipment we recommend are as follows:

Solar panels:	40 years
Hybrid Inverter(s):	10 years

In addition, Infinity Energy Services provides a free 6-year **insurance-backed guarantee** on our workmanship. In the first instance, if you are not 100% satisfied with our workmanship, you should contact us on 0800 909 8882 and we will come out and rectify it, free of charge. If our company is no longer trading, you would contact the insurance company, IWA, who will send a qualified company out to fix the problem, again free of charge.

The insurance policy also guarantees your deposit, such that if anything happens to us before

References

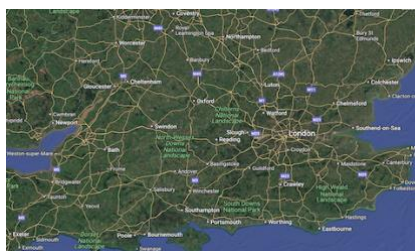
Infinity Energy Services has been installing solar PV systems since 2011. We are technically-led and put great emphasis on excellent electrical design, creating solar panels systems that produce the maximum amount of electricity possible in any given location.

We also pride ourselves on outstanding customer service; before, during, and after installation. We are happy to put you in touch with previous customers so you can hear their feedback direct. In the meantime, please refer to our Checktrade web:

Why trust Infinity Energy Services with your solar panel project?

We are delighted you have asked us to prepare a proposal for you. The following pages contain a comprehensive analysis of your needs, together with our recommended solution.

There are many solar and battery companies out there, so why choose us?



Highly Experienced

We've been designing and installing renewable energy systems since 2011. We've got plenty of in-house expertise and represent a safe pair of hands for your energy project.

Multi-Award-Winning

We are back-to-back Winners of the Energy Efficiency Regional Solar PV Installer of the Year Award 2023 & 2024, and placed Second in the National Solar PV Installer of the Year Award 2023.

Infinity Certified Installers

We vet and certify all our installation engineers to guarantee top quality, every time. All engineers are fully qualified and follow our proprietary 10-step process to ensure a safe installation, conforming to all regulations and best practice.

Local

Installing in Hampshire, Dorset, Wiltshire, Berkshire, Surrey, West Sussex, Cambridgeshire, Hertfordshire, Bedfordshire and Buckinghamshire, we have a local reputation to protect and always go the extra mile to make sure you are 100% happy.

One-Stop-Shop

In addition to solar panels, battery storage, and EV chargers, we also have specialist heat pump and air conditioning partners. We can advise you on how all of these technologies can best work together to save you money and lower emissions.

Here For The Long Term

We were founded over a decade ago when solar panels were first introduced to the UK. We've weathered all of the subsequent ups and downs of the industry. We're a strong, resilient company, with over 40 employees, and will be around in the future in case you need our help.

What are our customers saying?

“Professional and efficient. I thought my installers in my last property were top notch but Infinity are Premier League.” – Colin M, 25 January 2024

“Every member of the team was helpful, knowledgeable and friendly. All questions were answered and quotes updated no matter how many questions were asked. The installation team were clean, neat and professional. Could not have wished for a better company to deal with. Highly recommended.”

– Adrian P, 24 January 2024

“Wow! What a team - Infinity from start to finish have been amazing. Every person from the team I've dealt with has been helpful, professional and responsive. These guys are the experts and really care about the work they do.” – Lucy B, 5 September 2023

Check out our handy explainer videos

Discover how we install solar panels on your roof

https://youtu.be/mY5_jhONkaM?si=P2X8EDVdRYj80V1j



Learn all about Infinity Energy Services

<https://youtu.be/zYaL2crVCz4?si=yb2Z4MEqsyWGI55g>



The Next Steps

We trust our careful, detailed approach to your project is what you are looking for and that our overall fee is competitive.

If you have any questions at all, about any aspect of the design or equipment choice, please do not hesitate to ask.

If you did wish to progress with us, the next steps would be:

1. Finalise the design for the solar PV system.
2. We will take a £200 deposit to fix prices and start the paperwork.
3. Agree an installation date (usually within 7 working days from DNO sent).
4. We send you an order confirmation form which you sign and then pay us a 20% deposit (with the initial £200 deducted from this amount).
5. We place orders for all the equipment.
6. 14 days prior to installation you will be asked to pay us 40% stage 2 deposit.
7. We install and commission the solar panel system on the agreed date.
8. You pay us the balance on completion.
9. We notify the DNO that the system has been energised.

Best regards

Daniel Tulit , Infinity Energy Services Ltd

Phone: 01489 533500

Email: Daniel.tulit@infinity-energy.co.uk

The Appendix



Infinity Energy Services Ltd

Unit 6 Swanwick Business Centre, Bridge Road
Southampton, SO31 7GB

Simon Hopwood
16 Wykeham Place Fareham PO16 0FA

Contact person:

Dan Tulit
Phone: 01489661026
E-Mail: daniel.tulit@infinity-energy.co.uk

Project Name: Hopwood-2.97kWp-S495-F5-EP12x2

06/08/2026

Your PV system from Infinity Energy Services Ltd

Address of Installation

16 Wykeham Place Fareham PO16 0FA



Project Overview



Figure: Overview Image, 3D Design

PV System

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

Climate Data	Solent M.r.s.c., GBR (2001 - 2020)
Values source	Meteonorm 9.0
PV Generator Output	2.97 kWp
PV Generator Surface	12.2 m ²
Number of PV Modules	6
Number of Inverters	1
No. of battery systems	1

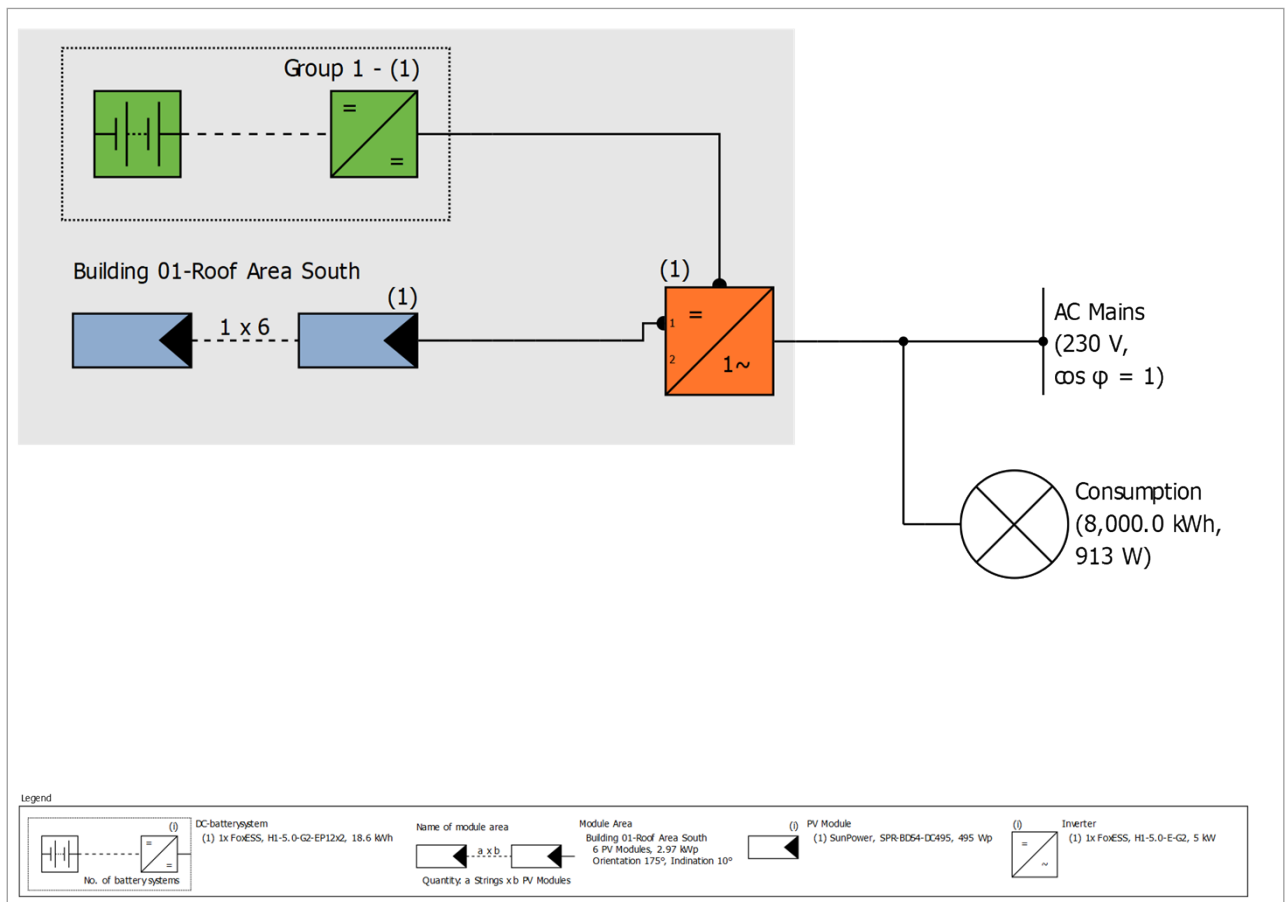


Figure: Schematic diagram

Production Forecast

Production Forecast

PV Generator Output	2.97 kWp
Spec. Annual Yield	927.07 kWh/kWp
Performance Ratio (PR)	80.61 %
Yield Reduction due to Shading	15.0 %
PV Generator Energy (AC grid) with battery	2,703 kWh/Year
Direct Own Use	2,703 kWh/Year
Grid Export	0 kWh/Year
Own Power Consumption	100.0 %
CO ₂ Emissions avoided	994 kg / year
Level of Self-sufficiency	33.8 %

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	Solent M.r.s.c., GBR (2001 - 2020)
Values source	Meteonorm 9.0
Data resolution	1 h
Simulation models used:	
- Diffuse Irradiation onto Horizontal Plane	Hofmann
- Irradiance onto tilted surface	Hay & Davies

Consumption

Total Consumption	8000 kWh
Load profile with constant load	8000 kWh
Load Peak	0.9 kW

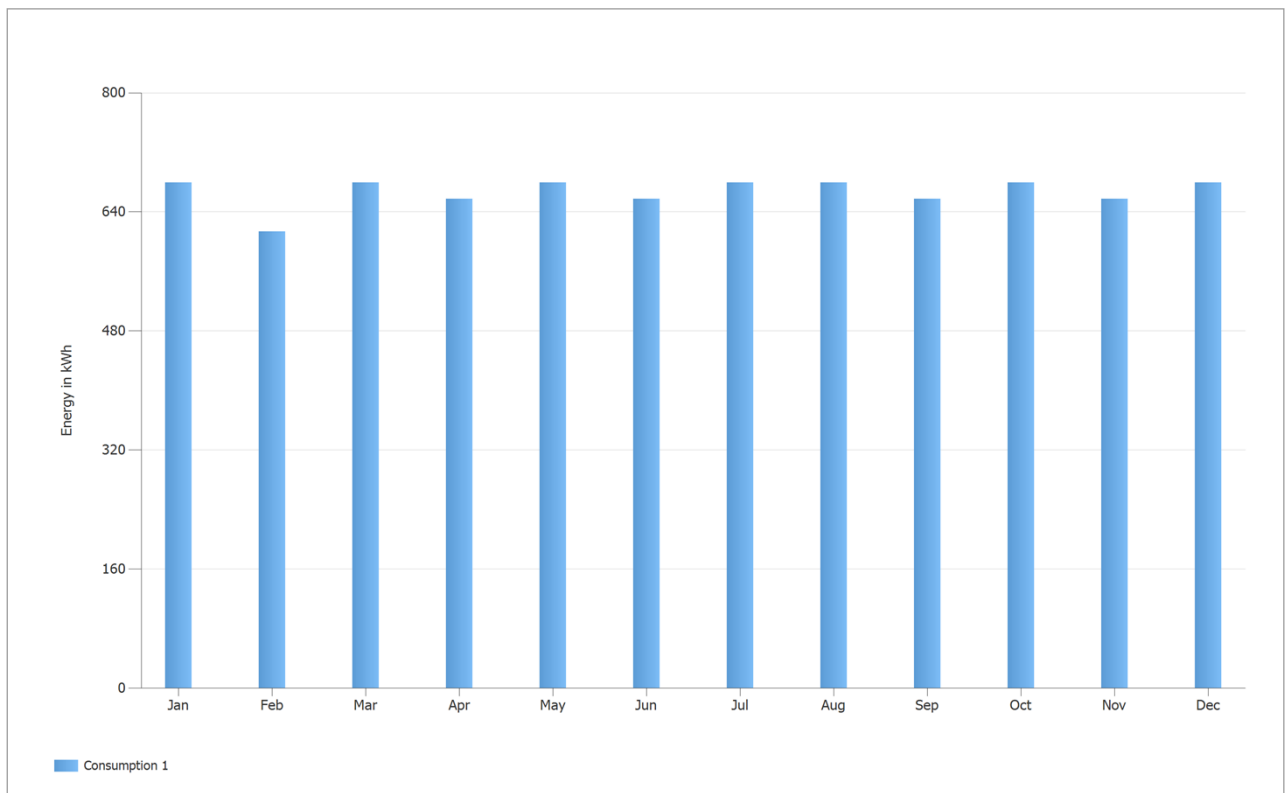


Figure: Consumption

Module Areas

1. Module Area - Building 01-Roof Area South

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

Name	Building 01-Roof Area South
PV Modules	6 x SPR-BD54-DC495 (v1)
Manufacturer	SunPower
Inclination	10 °
Orientation	South 175 °
Installation Type	Mounted - Roof
PV Generator Surface	12.2 m ²

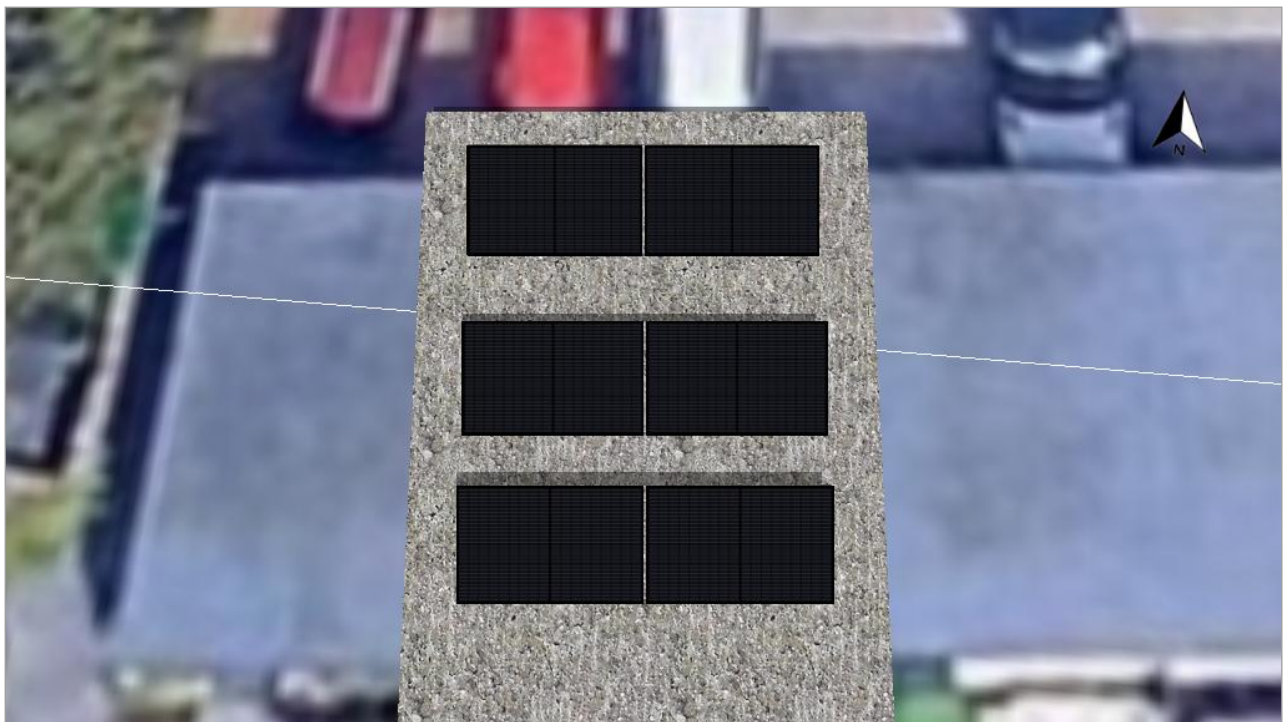


Figure: 1. Module Area - Building 01-Roof Area South

Horizon Line, 3D Design

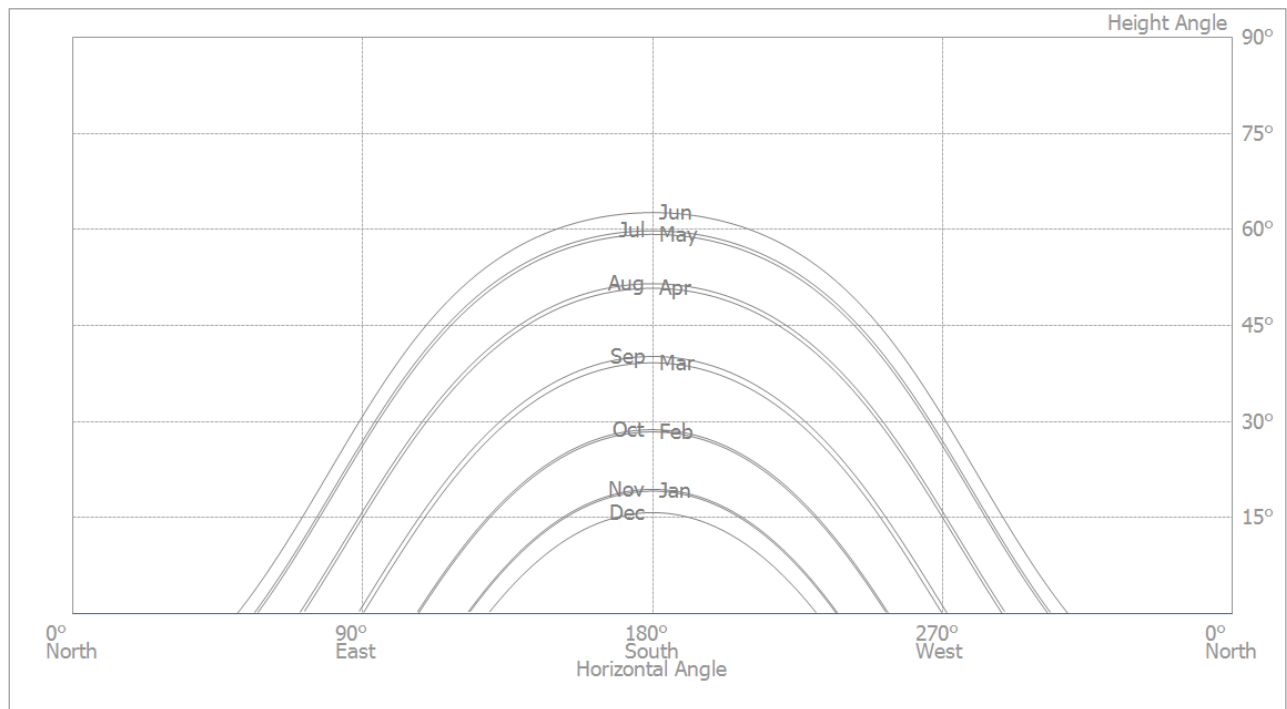


Figure: Horizon (3D Design)

Inverter configuration

Configuration 1

Module Area	Building 01-Roof Area South
Inverter 1	
Model	H1-5.0-E-G2 (v2)
Manufacturer	FoxESS
Quantity	1
Sizing Factor	59.4 %
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 - Group 1

Model	H1-5.0-G2-EP12x2 (v1)
Manufacturer	FoxESS
Quantity	1
Battery Inverter	
Type of coupling	DC intermediate circuit coupling
Nominal output	5 kW
Battery	
Manufacturer	FoxESS
Model	EP12 (v7)
Quantity	2
Battery Energy	18.6 kWh
Battery Type	Lithium iron phosphate

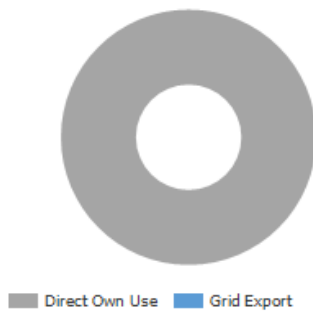
Simulation Results

Results Total System

PV System

PV Generator Output	2.97 kWp
Spec. Annual Yield	927.07 kWh/kWp
Performance Ratio (PR)	80.61 %
Yield Reduction due to Shading	15.0 %
PV Generator Energy (AC grid) with battery	2,703 kWh/Year
Direct Own Use	2,703 kWh/Year
Grid Export	0 kWh/Year
Own Power Consumption	100.0 %
CO ₂ Emissions avoided	994 kg / year

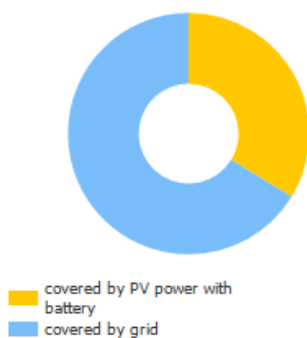
PV Generator Energy (AC grid) with battery



Appliances

Appliances	8,000 kWh/Year
Standby Consumption (Inverter)	10 kWh/Year
Total Consumption	8,010 kWh/Year
covered by PV power with battery	2,703 kWh/Year
covered by grid	5,306 kWh/Year
Solar Fraction	33.8 %

Total Consumption



Battery System

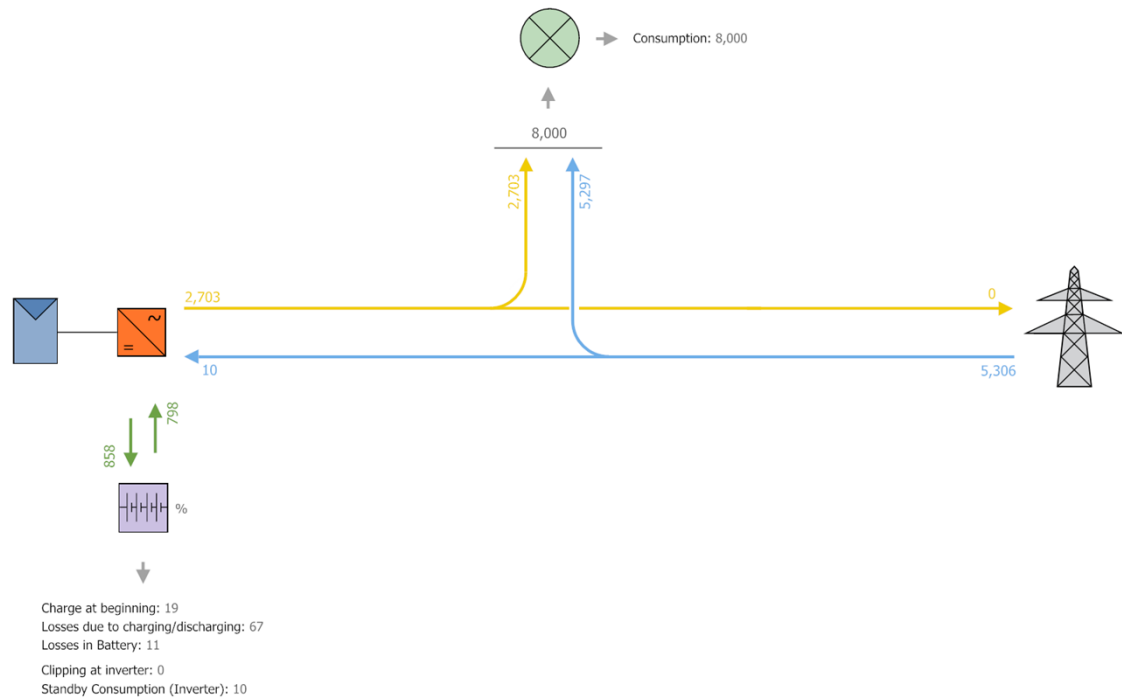
Charge at beginning	19 kWh
Battery Charge (PV System)	858 kWh/Year
Battery Energy for the Covering of Consumption	798 kWh/Year
Battery discharge into the grid	0 kWh/Year
Losses due to charging/discharging	67 kWh/Year
Losses in Battery	11 kWh/Year
Cycle Load	1.1 %
Service Life	>20 Years

Level of Self-sufficiency

Total Consumption	8,010 kWh/Year
covered by grid	5,306 kWh/Year
Level of Self-sufficiency	33.8 %

Energy Flow Graph

Project: Hopwood-2.97kWp-S495-F5-EP12x2



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

Figure: Energy flow

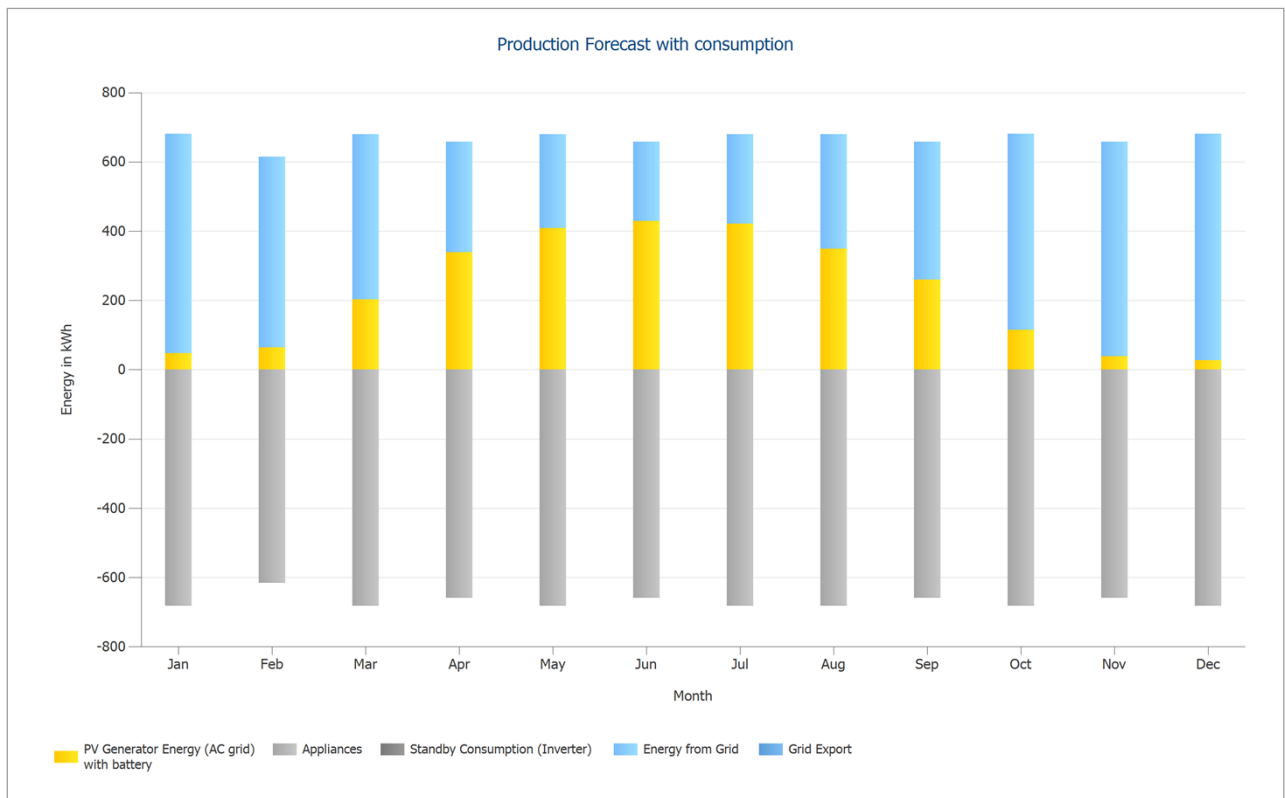


Figure: Production Forecast with consumption

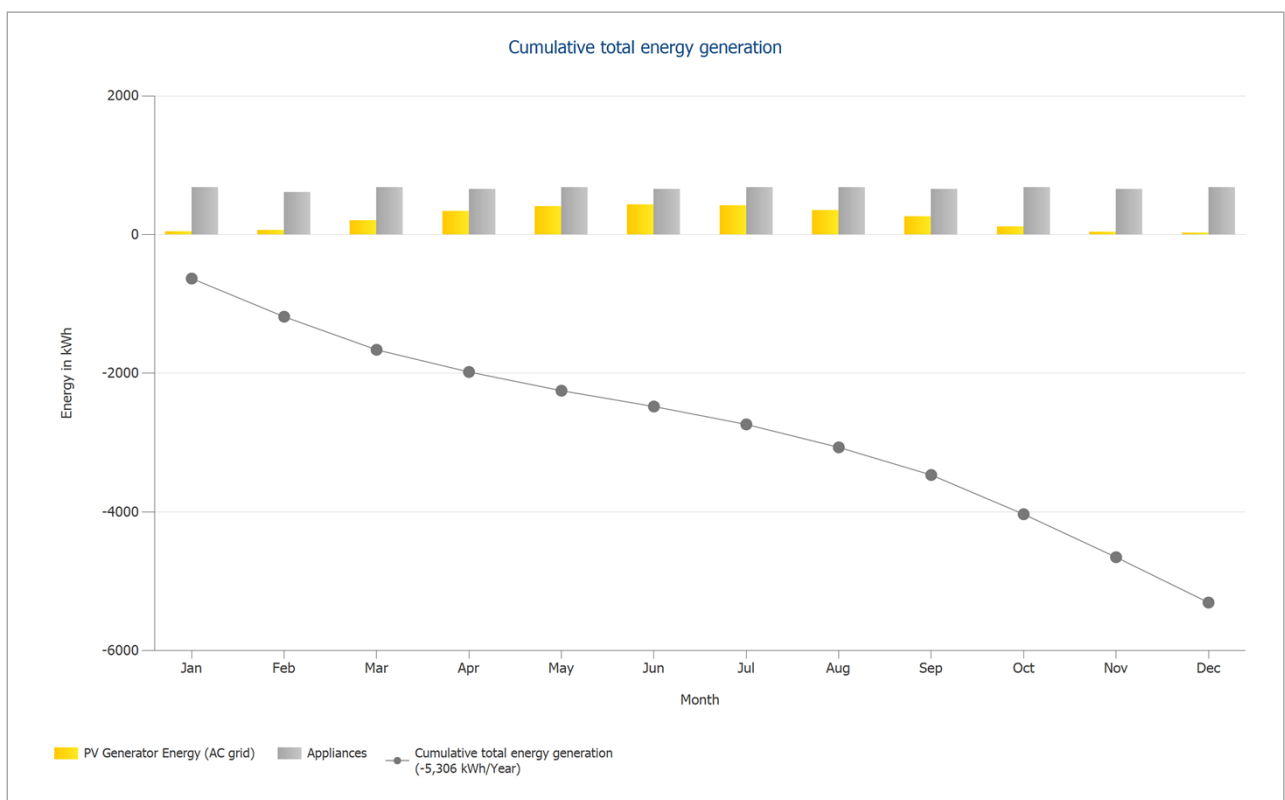


Figure: Cumulative total energy generation

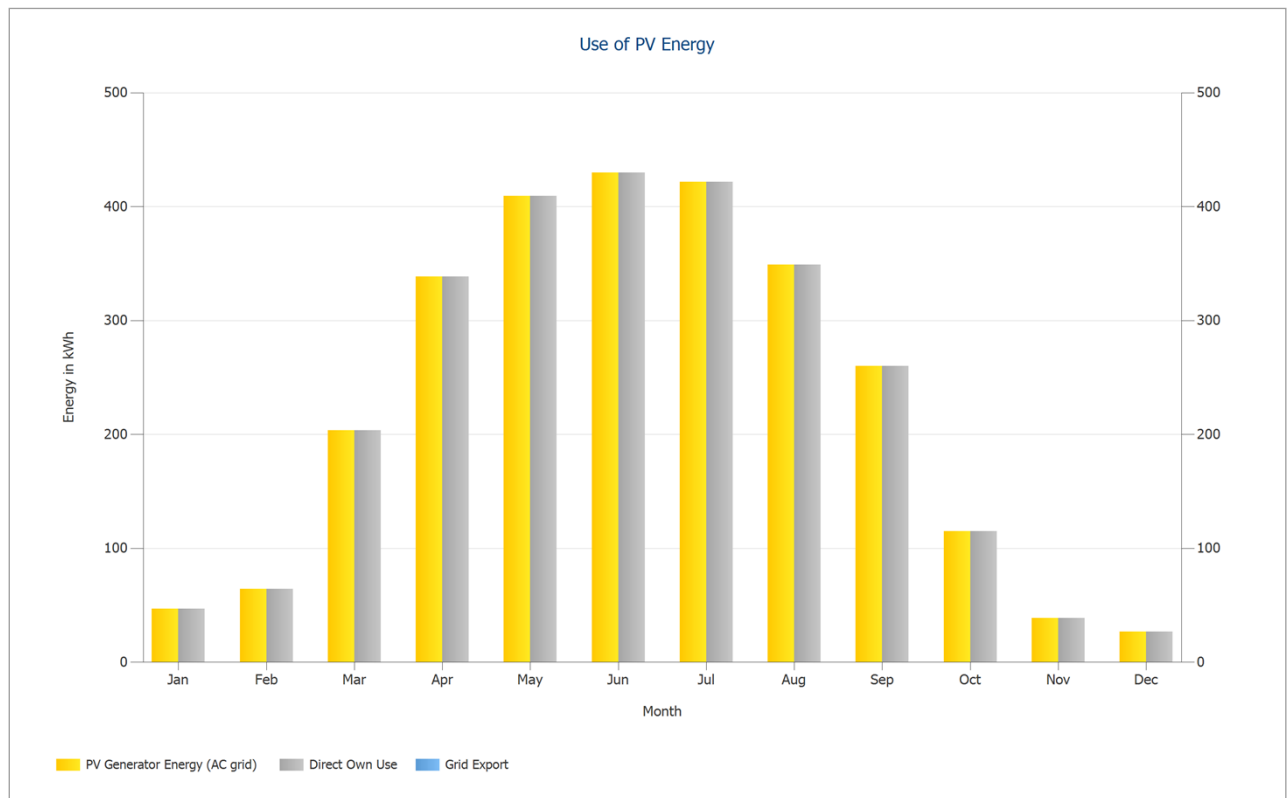


Figure: Use of PV Energy

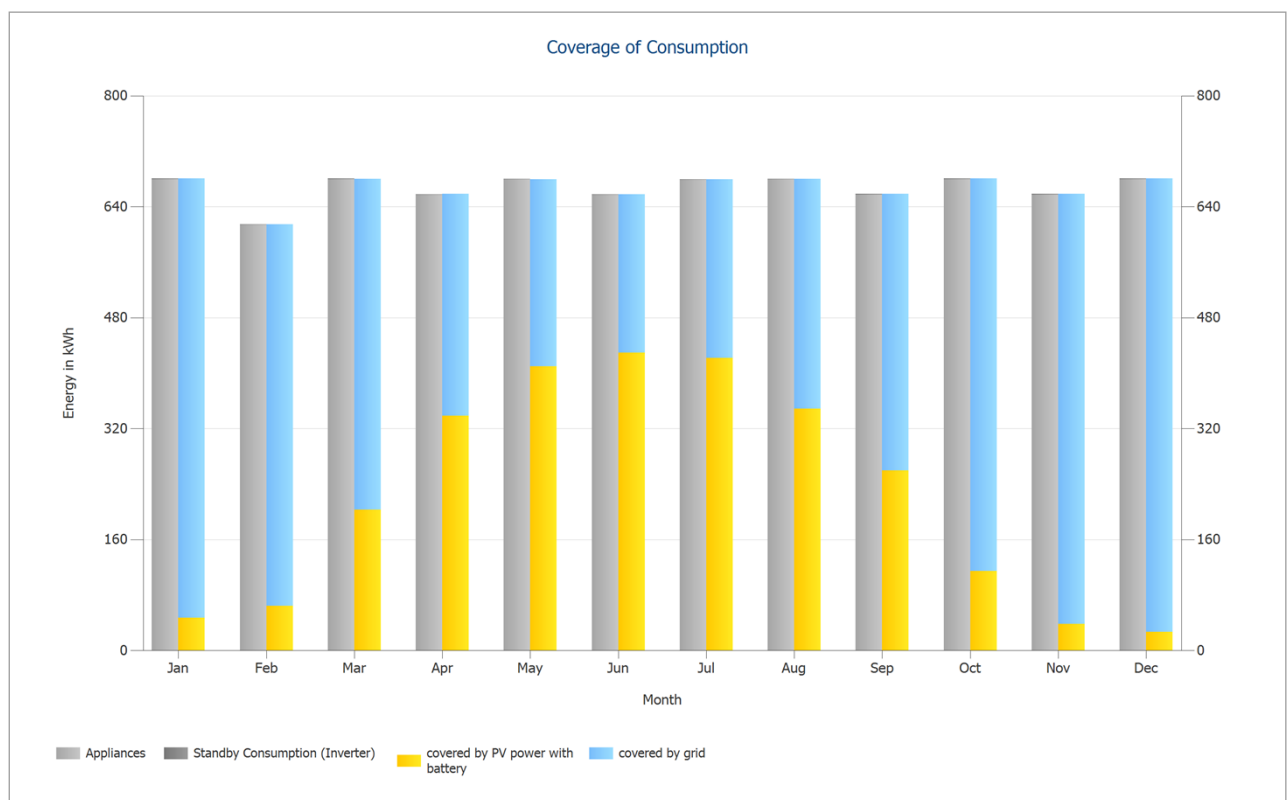


Figure: Coverage of Consumption

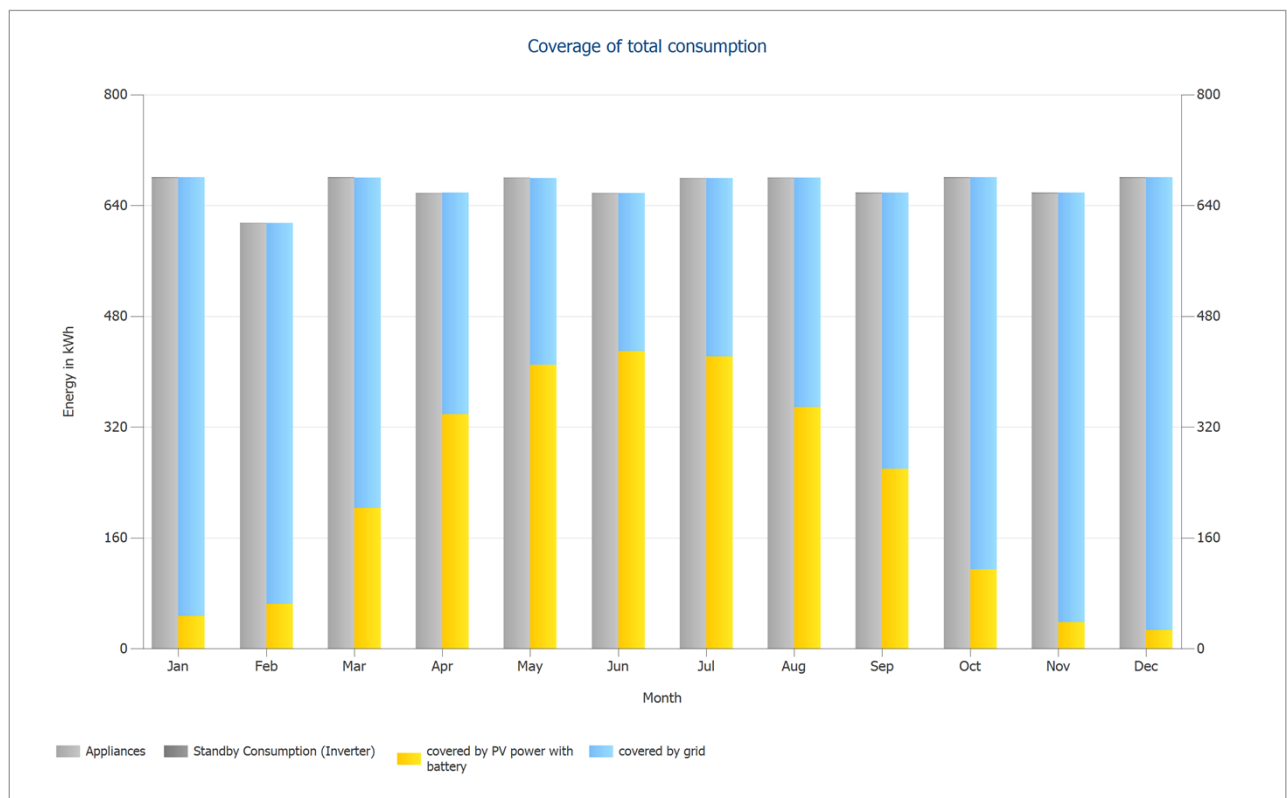


Figure: Coverage of total consumption

Table: Coverage of total consumption

	Jan	Feb	Mar	Apr	May	Jun
	kWh	kWh	kWh	kWh	kWh	kWh
Appliances	679.5	613.7	679.5	657.5	679.5	657.5
Standby Consumption (Inverter)	1.3	1	1	0.6	0.4	0.2
covered by PV power with battery	47	64.2	203.4	338.6	409.5	429.8
covered by grid	633.8	550.5	477	319.6	270.3	227.9

	Jul	Aug	Sep	Oct	Nov	Dec
	kWh	kWh	kWh	kWh	kWh	kWh
Appliances	679.5	679.5	657.5	679.5	657.5	679.5
Standby Consumption (Inverter)	0.3	0.6	0.8	1.1	1.2	1.3
covered by PV power with battery	421.8	348.9	260	114.8	38.6	26.7
covered by grid	257.9	331.1	398.3	565.8	620.1	654.1

Plans and parts list

Circuit Diagram

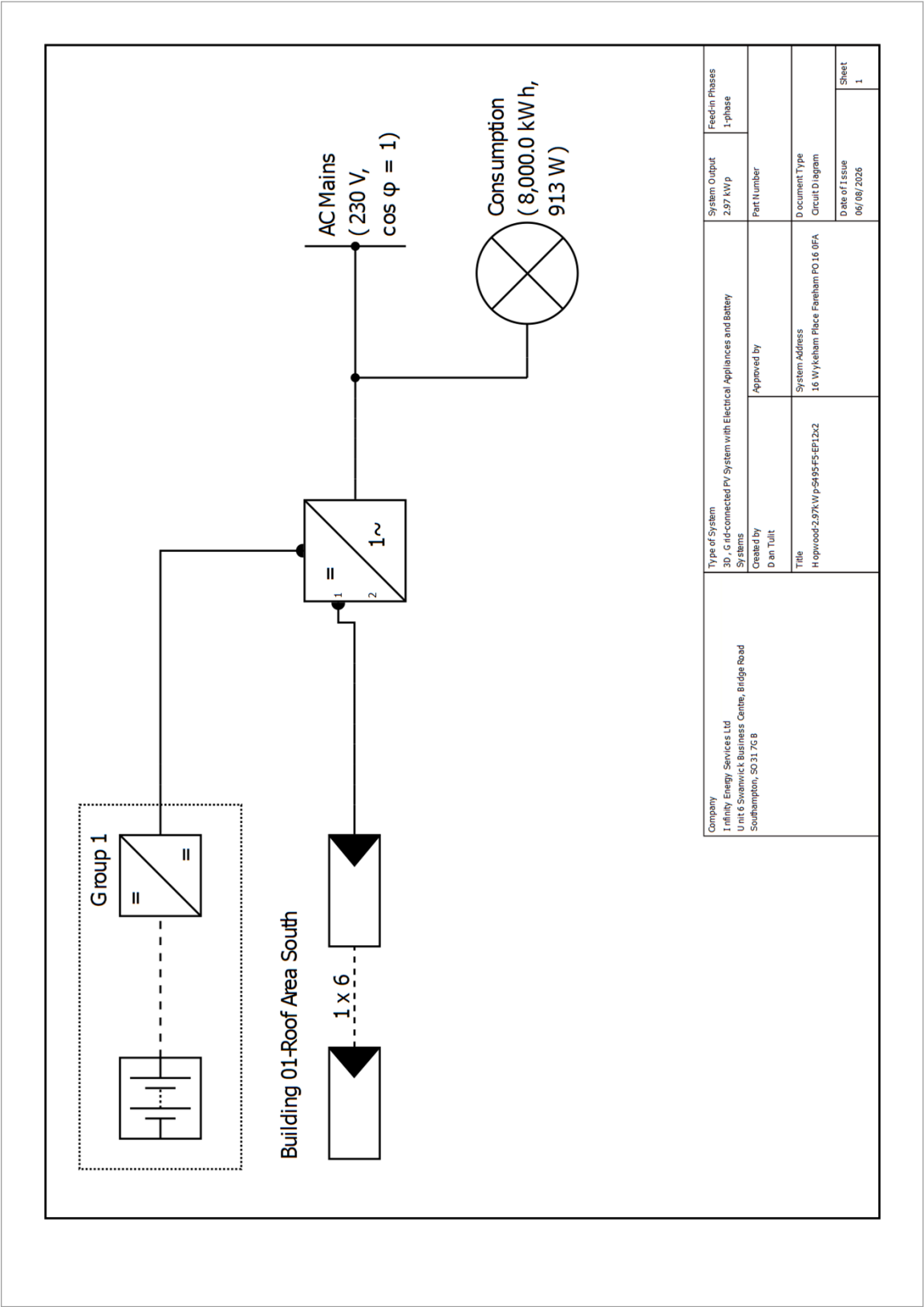


Figure: Circuit Diagram

Overview plan

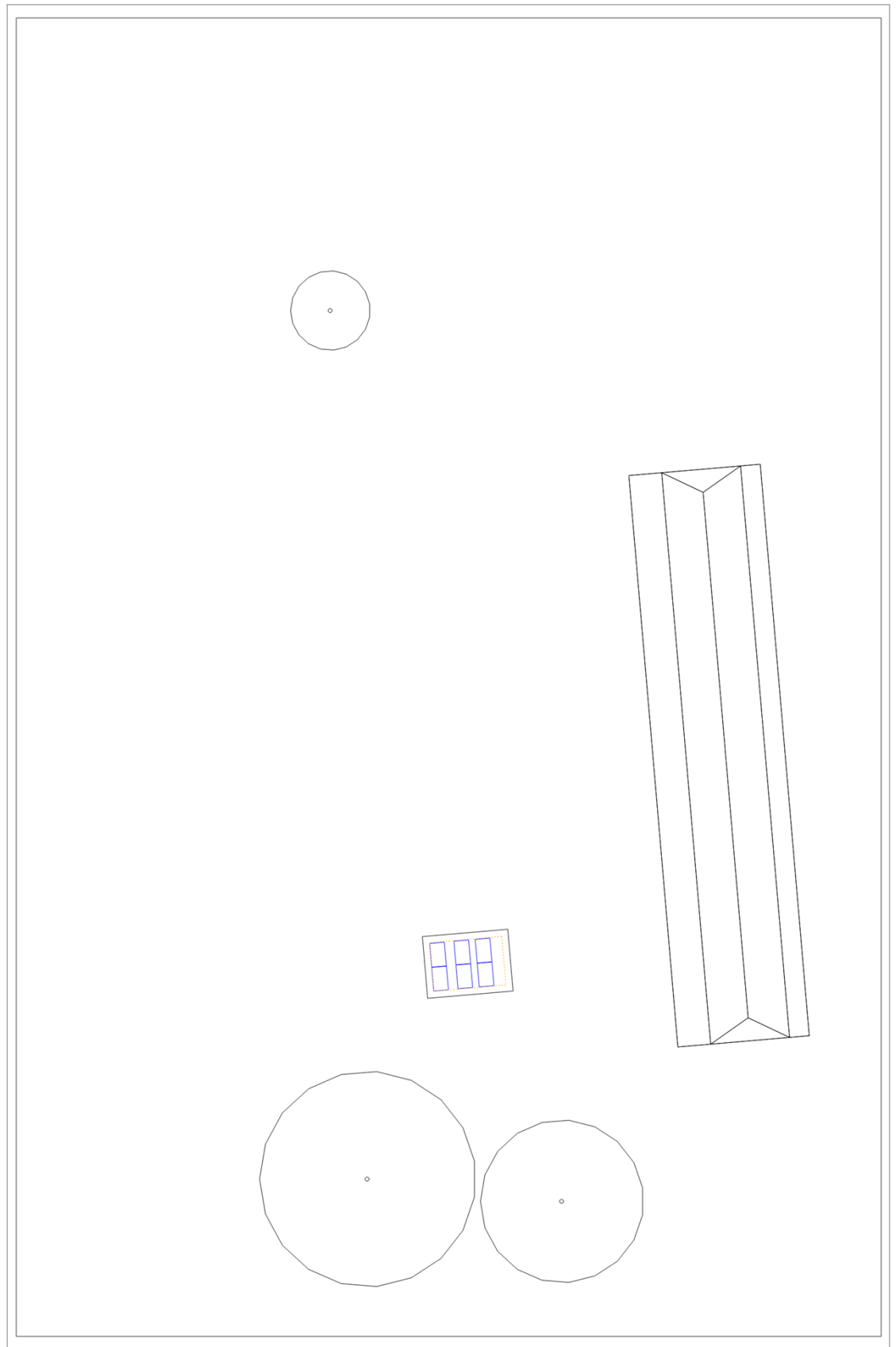


Figure: Overview plan

Dimensioning Plan

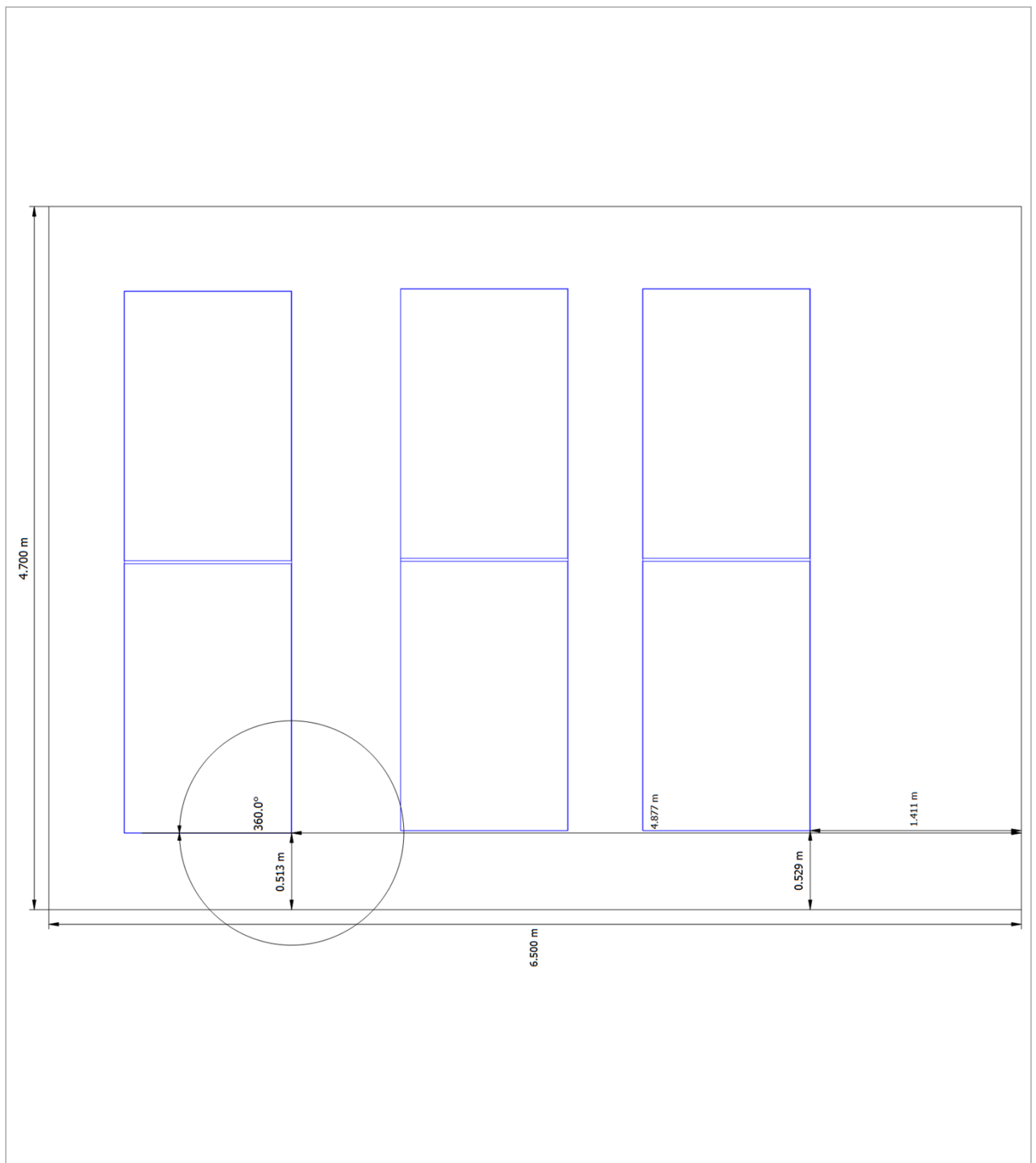


Figure: Building 01 - Roof Area South

String Plan

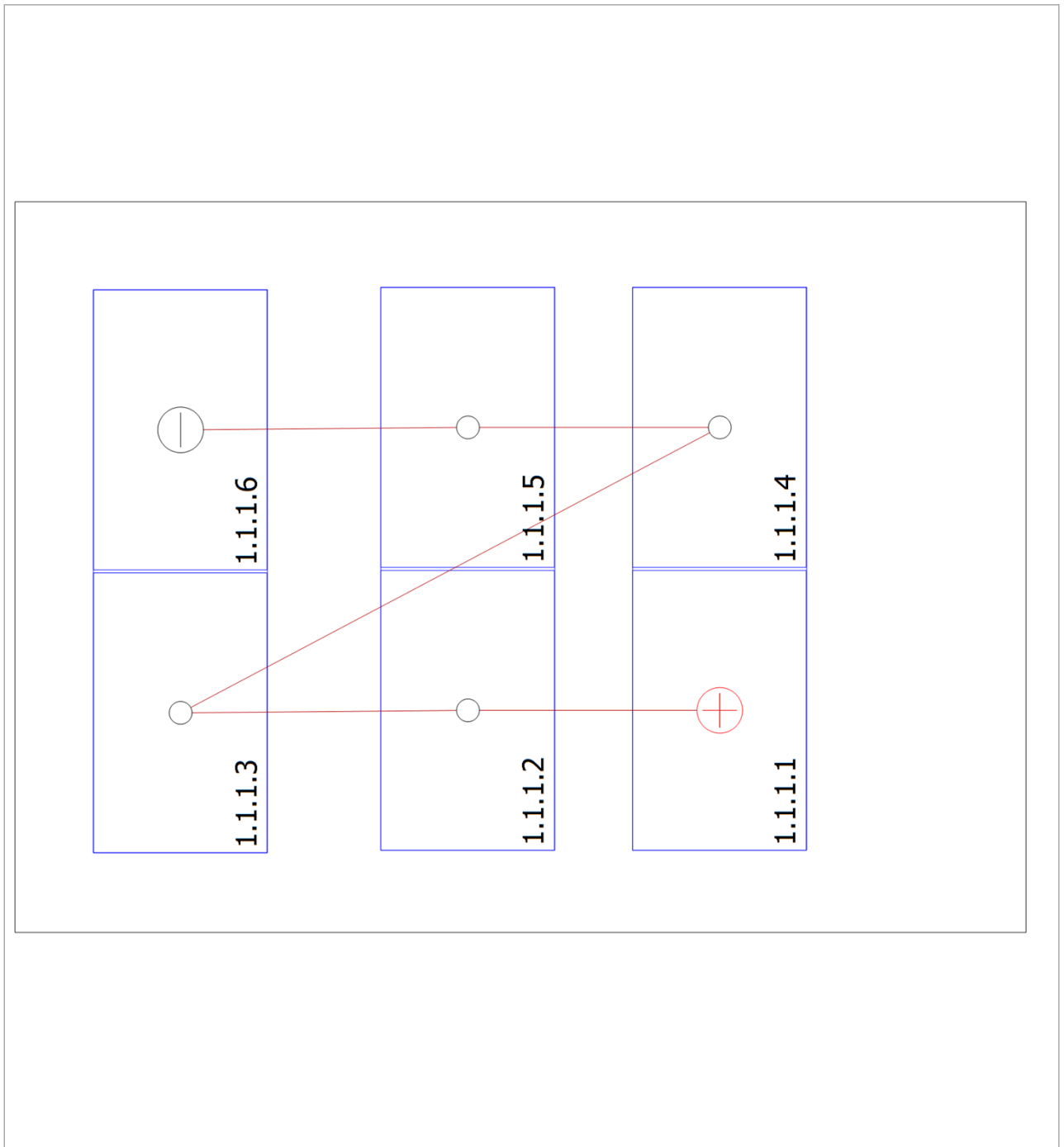


Figure: Building 01 - Roof Area South

Parts list

Parts list

#	Type	Item number	Manufacturer	Name	Quantity	Unit
1	PV Module		SunPower	SPR-BD54-DC495	6	Piece
2	Inverter		FoxESS	H1-5.0-E-G2	1	Piece
3	Battery System		FoxESS	H1-5.0-G2-EP12x2	1	Piece

Screenshots, 3D Design Environment



Figure: Screenshot04

Configuration



Figure: Screenshot05

Shading

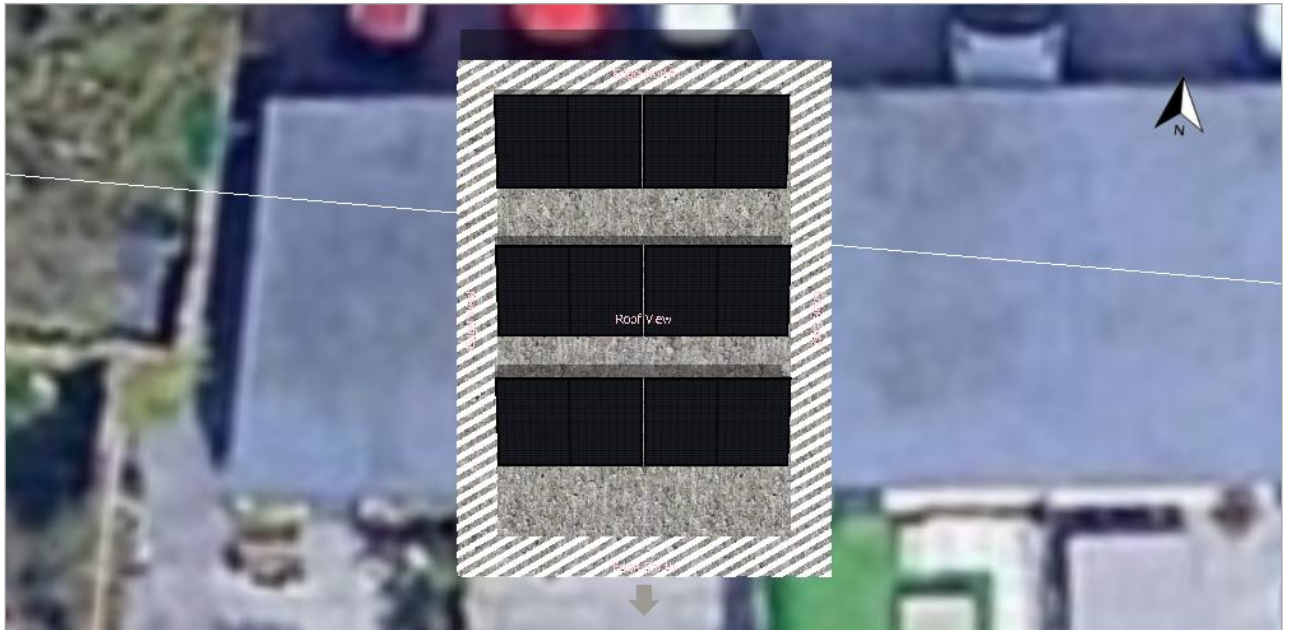


Figure: Screenshot02

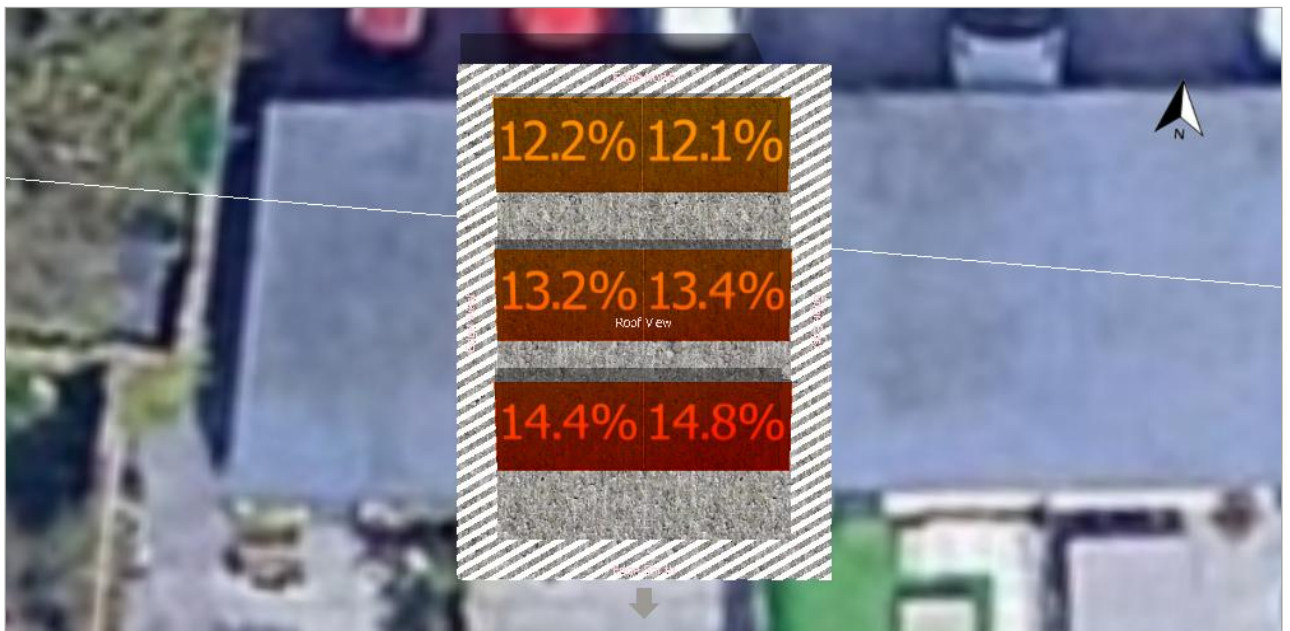


Figure: Screenshot03

SunPower

M Class Solar Panel

Product: SPR-BD54-DC

490–505 W | Up to 24.7% efficient

PRELIMINARY



Ideal for residential applications



Framed glass-glass



Back contact technology



Bifacial energy generation

Maximum energy creation

- Record efficiency¹
- Leading back contact technology
- Industry's lowest degradation rate²
- Optimized for partial shading

Superior aesthetics & design

- Sleek panel technology
- Resistance to micro-crack, soiling, heat, wind and hail
- Extended certification scope

Unrivalled sustainability and service

- Part of TCL SOLAR ecosystem
- 40 years service coverage



Backed by a comprehensive 40-year warranty

Product, power, service coverage	40 years
Year 1 minimum warranted output	99.0%
Maximum annual degradation	0.25%

SUNPOWER

Learn more about SunPower M Class panels
www.sunpowerglobal.com



M Class POWER: 490–505 W | EFFICIENCY: Up to 24.7%

Electrical Data, Front STC Characteristics ³				
	SPR-BD54-DC490	SPR-BD54-DC495	SPR-BD54-DC500	SPR-BD54-DC505
Nominal Power (P _{nom}) ⁴	490 W	495 W	500 W	505 W
Power Binning	+3/0%	+3/0%	+3/0%	+3/0%
Panel Efficiency	24.0%	24.3%	24.5%	24.7%
Rated Voltage (V _{mpp})	34.07 V	34.17 V	34.27 V	34.37 V
Rated Current (I _{mpp})	14.38 A	14.49 A	14.59 A	14.69 A
Open-Circuit Voltage (V _{oc}) ⁴	41.25 V	41.35 V	41.45 V	41.55 V
Short-Circuit Current (I _{sc}) ⁴	15.04 A	15.15 A	15.26 A	15.37 A

BNPI Data ⁵				
Nominal Power (P _{max}) ⁴	529 W	535 W	540 W	546 W
Open-Circuit Voltage (V _{oc}) ⁴	41.25 V	41.35 V	41.45 V	41.55 V
Short-Circuit Current (I _{sc}) ⁴	16.26 A	16.38 A	16.50 A	16.61 A

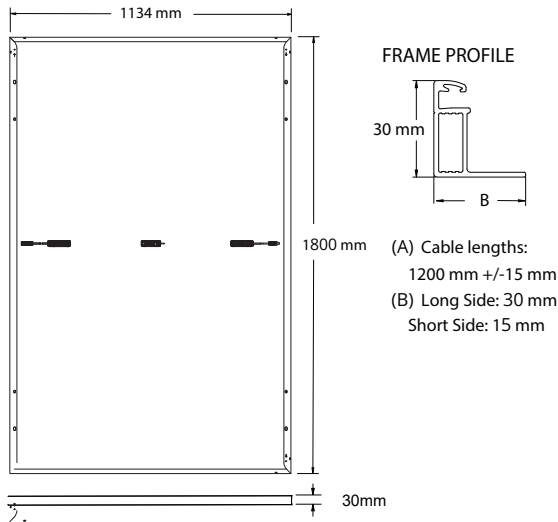
Bifacial Gain ⁶				
P _{max} with 5% Bifacial Gain	515 W	520 W	525 W	530 W
I _{sc} with 5% Bifacial Gain	15.79 A	15.91 A	16.02 A	16.14 A
P _{max} with 10% Bifacial Gain	539 W	545 W	550 W	556 W
I _{sc} with 10% Bifacial Gain	16.54 A	16.67 A	16.79 A	16.91 A

Electrical Data	
Bifaciality (φP _{max} /φI _{sc})	60% +/-5%
Maximum System Voltage	1500 V IEC
Testing Temperature	-40°C to +85°C
Operation Temperature	-40°C to +70°C (IEC TS 63126)
Maximum Series Fuse	30 A
Power Temp. Coef.	-0.24% / °C
Voltage Temp. Coef.	-0.21% / °C
Current Temp. Coef.	0.05% / °C

Packaging Configuration	
Number of modules per pallet	36
Number of pallets per 40ft HQ container	24
Number of modules per container	864

Tests And Certifications	
Standard Tests	IEC 61215, IEC 61730
Fire Rating	Class C (IEC 61730-2 / UL 790)
Protection Class	Class II (IEC 61140)
Quality Certs	ISO 9001:2015, ISO 14001:2015
EHS Compliance	ISO 45001:2018, ISO 50001:2018, Recycling Scheme
Ammonia Test	IEC 62716
Dust and Sand	IEC 60068-2-68
Salt spray test	IEC 61701

Mechanical Data	
Solar Cells	N-Type Back Contact
Glass	2.0 mm + 1.6 mm, semi tempered glass, AR coating on front glass
Junction Box	IP-68, 3 bypass diodes
Connector	Stäubli MC4-EVO2A
Weight	23.5 kg
Max. Load ⁷	Wind: 2400 Pa, 245 kg/m ² front & back Snow: 5400 Pa, 550 kg/m ² front
Impact Resistance	25 mm diameter hail at 23 m/s
Frame	Black anodized aluminum alloy



1 Based on <https://taiyangnews.info/topmodules/top-solar-modules-listing-january-2026>.
2 Based on 2024 review of published efficiency and warranty data on manufacturer websites for top 20 manufacturers per IHS 2023.
3 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.
4 Measurements tolerance +/-3%.
5 BNPI Test Condition (front 1000 W/m², rear 135W/m² irradiance, AM 1.5, 25° C).
6 The additional gain from the back side of the panel compared to the power of the front side of the panel at the standard test conditions. It depends on mounting (structure, height, tilt angle etc.) and albedo of the underlying surface.
7 Test load as per IEC 61215-2 is equal to design load with safety factor = 1.5. See "Safety and Installation Instructions" for details.
Specifications included in this datasheet are subject to change without notice.
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Please read the safety and installation instructions. Visit www.sunpowerglobal.com/PVInstallGuide. Paper version can be requested through techsupport.EN@sunpowerglobal.com

SUNPOWER



H1(G2)/AC1(G2)

SINGLE-PHASE **HYBRID/AC INVERTER**



HIGH VOLTAGE

Includes high-voltage batteries for maximum round-trip efficiency.



EASY INSTALLATION

Flexible configuration, plug and play set-up, built-in fuse protection.



IP65 RATED

Engineered to last with maximum flexibility. Suitable for outdoor installation.



REMOTE MONITORING

Monitor your system remotely via smartphone app or web portal.



Advanced System Monitoring
with **FoxCloud V2.0**

REFINED – POWERFUL – FLEXIBLE

Harness the power of the sun day and night with the ground-breaking range of Hybrid & AC inverter from Fox ESS. Full of advanced features and compatible with our very own range of high-voltage batteries, the hybrid range from Fox ESS.

3kW ...>> 6kW



For more information about the Fox ESS range, visit:
www.fox-ess.com



up to
6kW
charge/
discharge

TECHNICAL SPECIFICATIONS

MODEL	H1-3.0-E-G2 AC1-3.0-E-G2	H1-3.7-E-G2 AC1-3.7-E-G2	H1-4.6-E-G2 AC1-4.6-E-G2	H1-5.0-E-G2 AC1-5.0-E-G2	H1-6.0-E-G2 AC1-6.0-E-G2
INPUT PV (ONLY FOR HYBRID)					
Max. Array Power [Wp]	6000	7400	9200	10000	12000
Max. Input Power [W]	4500 A:2250 B:2250	5500 A:2750 B:2750	6900 A:3450 B:3450	7500 A:3750 B:3750	9000 A:4500 B:4500
Max. Input Voltage [V]			600		
Start-up Input Voltage [V]			75		
Rated Input Voltage [V]			360		
MPPT Operating Voltage Range [V]			80 ~ 550		
Max. Input Current [A]			16 / 16		
Max. Short-circuit Current [A]			20 / 20		
No. of MPP Trackers			2		
Strings per MPP Tracker			1		
BATTERY CONNECTION					
Battery Type			Lithium Battery (LFP)		
Battery Voltage [V]			80 ~ 480		
Max. Charge/Discharge Current [A]			40		
Communication Interface			CAN(communicate with inverter, upgrade BMS)		
AC INPUT AND OUTPUT (GRID)					
Max. AC Input Power [VA]	6000	7680	9200	10000	12000
Max. AC Input Current (per phase) [A]	27.3	34.9	41.8	45.5	54.5
Rated Output Power [W]	3000	3680	4600	5000	6000
Max. Output Apparent Power [VA]	3300	4048/3680 ¹	5060	5500	6600
Rated Output Current (per phase) [A]	13.6	16.7/16 ¹	20.9	22.7	27.3
Rated Output Current (per phase) [A](For AUS)	13.0	16.0	20.0	21.7	26.1
Max. Output Current [A]	15.0	18.4	23.0	25.0	30.0
Rated Grid Voltage [V]			220/230/240		
Rated Grid Frequency [Hz]			50/60		
Power Factor			1 (Adjustable from 0.8 leading to 0.8 lagging)		
THDi [%]			<3 @rated power		
EPS OUTPUT (WITH BATTERY)					
Max. Output Apparent Power [VA]	3000	3680	4600	5000	6000
Peak Output Apparent Power (60s) [VA]	3600	4400	5500	6000	7200
Max. Current (per phase) [A]	13.6	16.7	20.9	22.7	27.3
Rated Output Voltage [V]			220/230/240		
Rated Output Frequency [Hz]			50/60		
Power Factor			1 (Adjustable from 0.8 leading to 0.8 lagging)		
THDv (Linear Load) [%]			<2 @rated power		
Parallel operation [PCS]			10		
Switch time [ms]			<20		
EFFICIENCY					
European Efficiency [%]	95.26	95.70	96.23	96.30	96.33
Max. Efficiency [%]	97.01	97.08	97.04	97.08	97.08
Max. Battery Charge Efficiency (PV to BAT) (@full load) [%]			98.50		
Max. Battery Discharge Efficiency (BAT to AC) (@full load) [%]			97.00		
PROTECTION					
Insulation Monitoring			YES		
Residual Current Monitoring			YES		
DC Reverse Polarity Protection			YES		
Anti-islanding Protection			YES		
AC Short-circuit Protection			YES		
AC Overcurrent/Overvoltage Protection			YES		
DC Switch			YES		
Battery Wake-up Function			YES		
SPD			DC: Type II /AC: Type III		
AFCI			Optional		
GENERAL DATA					
Dimensions (W*H*D) [mm]			434*418*185		
Weight [kg]			22		
Installation			Wall-Mounted		
Topology			Non-isolated		
Cooling Method			Natural		
Noise Emission [dB]			35		
Max. Operating Altitude [m]			2000		
Operating Temperature Range [°C]			-25 ~ 60		
Humidity (No Condensation) [%]			0 ~ 100		
Ingress protection			IP65		
Standby consumption[W]			< 15		
Monitoring Module			WiFi, LAN(Optional) , 4G(Optional)		
Communication			RS485, DRM, Ripple Control, USB, CAN		
Display			LCD, App, Website		
STANDARD COMPLIANCE (MORE AVAILABLE UPON REQUEST)					
Safety			EN 62109-1, EN 62109-2		
Grid Regulation			G98, G99, EN50549, AS / NZS 4777.2		

* More technical characteristics are available on demand and customized.

1. 3680 for G98.



EP12

HIGH VOLTAGE STORAGE BATTERY



Smart Battery Warming

- Scalable to 46.08kWh
- 90% Depth of Discharge
- Floor or Wall Mounting
- Compact & Easy Installation
- IP65 Protection Level
- High Voltage and High Efficiency



BATTERY
WARMING



SAFETY
RELIABLE



EASY
INSTALLATION



HIGH
EFFICIENCY



EXPANDABLE
SYSTEM



90%
DOD



BUILT-IN
FIRE SUPPRESSION

The EP12 is a high-performance, scalable battery storage system, allows for maximum flexibility, making it suitable for a broad range of storage applications.

Additional batteries can be installed in parallel allowing for a maximum storage capacity of 46.08kWh.



For more information about the Fox ESS range, visit:
www.fox-ess.com



TECHNICAL SPECIFICATIONS

SYSTEM NAME	EP12
MODEL	EP12 Plus
ELECTRICAL CHARACTERISTICS	
Compatible PCS	All Series of H1, KH, H3, H3-Pro, US
Battery Type	LFP (LiFePO ₄)
Nominal Energy [kWh]	11.52
Nominal Voltage [V]	384
Operating Voltage [V]	348 ~ 438
Max.Charge/Discharge Current [A]* ¹	30
Recommend Charge Current [A]	15
Peak Discharge Current [A]	65 @60s
Peak Charge Current [A]	36 @5s
Battery Pack Round-Trip Efficiency [%]	≥95
Depth of Discharge [%]	90
Cycle Life* ²	≥6000
Communication	CAN
Display	LED*5
Scalability	Max. 4 Units in Parallel
OPERATING CONDITIONS	
Installation Location	Outdoor/ Indoor
Operating Temperature [°C]	Charge: -25 ~ 55 Discharge: -25 ~ 55
Storage Temperature [°C]	-10 ~ 40
Cooling Method	Natural Convection
Humidity [%]	5 ~ 95 (No Condensation)
Altitude [m]	Max. 3,000
MECHANICAL CHARACTERISTICS	
Dimensions (W*H*D) [mm]	710*640*185
Weight [kg]	98
CERTIFICATES	
Safety	IEC62619
EMC	EN IEC 61000-6-1/2/3/4
Transportation	UN38.3
Ingress Protection	IP65

*1, The current is affected by temperature, cell voltage and SOC.

*2, @25C, @70% SOH, @90% DOD, 1C charging/discharging.

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