Accelerating the installation of solar PV and battery storage in East Preston and Angmering

12th March 2024

Alex Templeton

07814 477378 | alex.templeton@communityinfrastructure.co.uk

CW community works

What is stopping us?

A range of barriers prevent rapid adoption.

These include:

1) Cost
2) Slow rates of return on investment
3) Lack of understanding of technologies
4) Distrust of suppliers
5) A lack of data and information.

The purpose of Community Energy Service Companies (C-ESCos)

Aim: To make it as simple and easy as possible for anyone - household or organisation - to adopt renewable energy and battery storage

Key roles

1) To aggregate household and business projects in communities to achieve economies of scale and reduce finance costs

2) To offer households and businesses a ‘Pay as you use’ option

How this works

1. Conduct a geospatial survey of the area to identify potential energy projects
2. Build a list of those interested
3. Use this list to raise finance for project development
4. Conduct detailed feasibility study (including non-contractual expressions of interest from households)
5. Procurement, installation, commissioning, and operation
6. At this point:
    a) Households that want buy the PV array purchase it
    b) Households that cannot afford or do not want to purchase the PV array enter into a ‘Pay as you Use’ agreement
7. Scope for additional households to join later

What will this mean?

If you buy the PV:

- Reduced carbon emissions (0.19 kg CO2e per kWh)
- Reduced cost of electricity (10-25% from the energy generated from the array)
- 7-15 years to pay for itself (working life: 30+ years)

'Pay as you use' option

- Reduced carbon emissions
- Reduced cost of electricity (10-25% from the energy generated from the array, assumes using a 'Time of Use' Tariff such as Economy 7)
- Regular options to buy the PV at residual value

What have we done so far?

1. Conducted a geospatial survey of Angmering

Total suitable buildings: 4,209

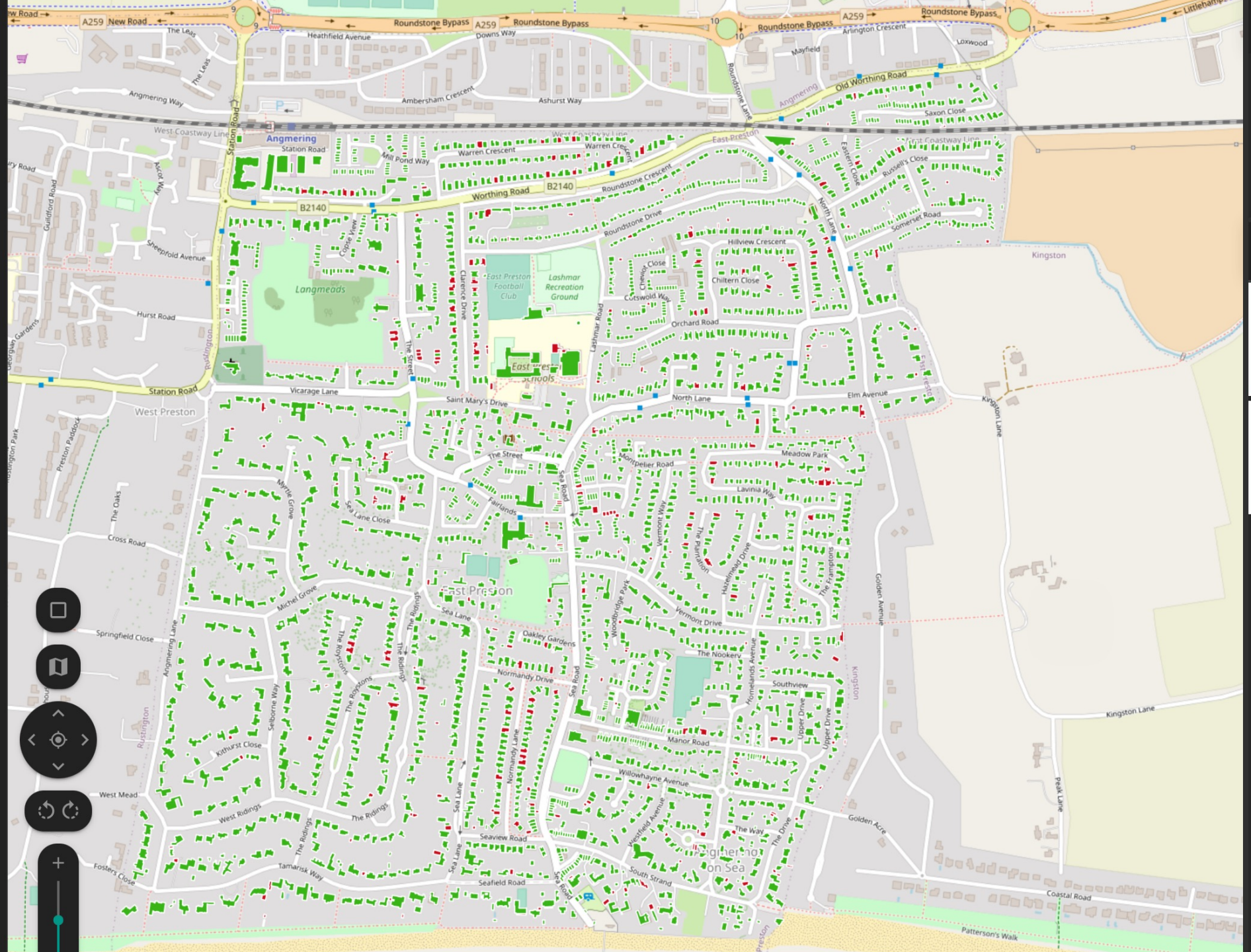
Potential power generation 17.95 MW

2. Secured support of West Sussex County Council

3. Secured funding from OFGEM and Innovate UK to develop elements of this model

The next six slides show:

1) High-level views of Angmering showing buildings assessed by the survey
2) A closer view of a cluster of buildings
3) Detailed data on an individual building
4) A list of the categories of data that the geospatial survey analyses and produces for each building



Info

Click on an item in the map to view its info

Layers

Angmering Rooftop Solar PV

Sampled

100

East Preston Rooftop Solar ...

Sampled

100

Angmering & East Preston Rooft...

Info

ID

2254

Fid Build

osgb1000002278303

Layers

Angmering Rooftop Solar PV

Sampled

100

East Preston Rooftop Solar ...

Sampled

100

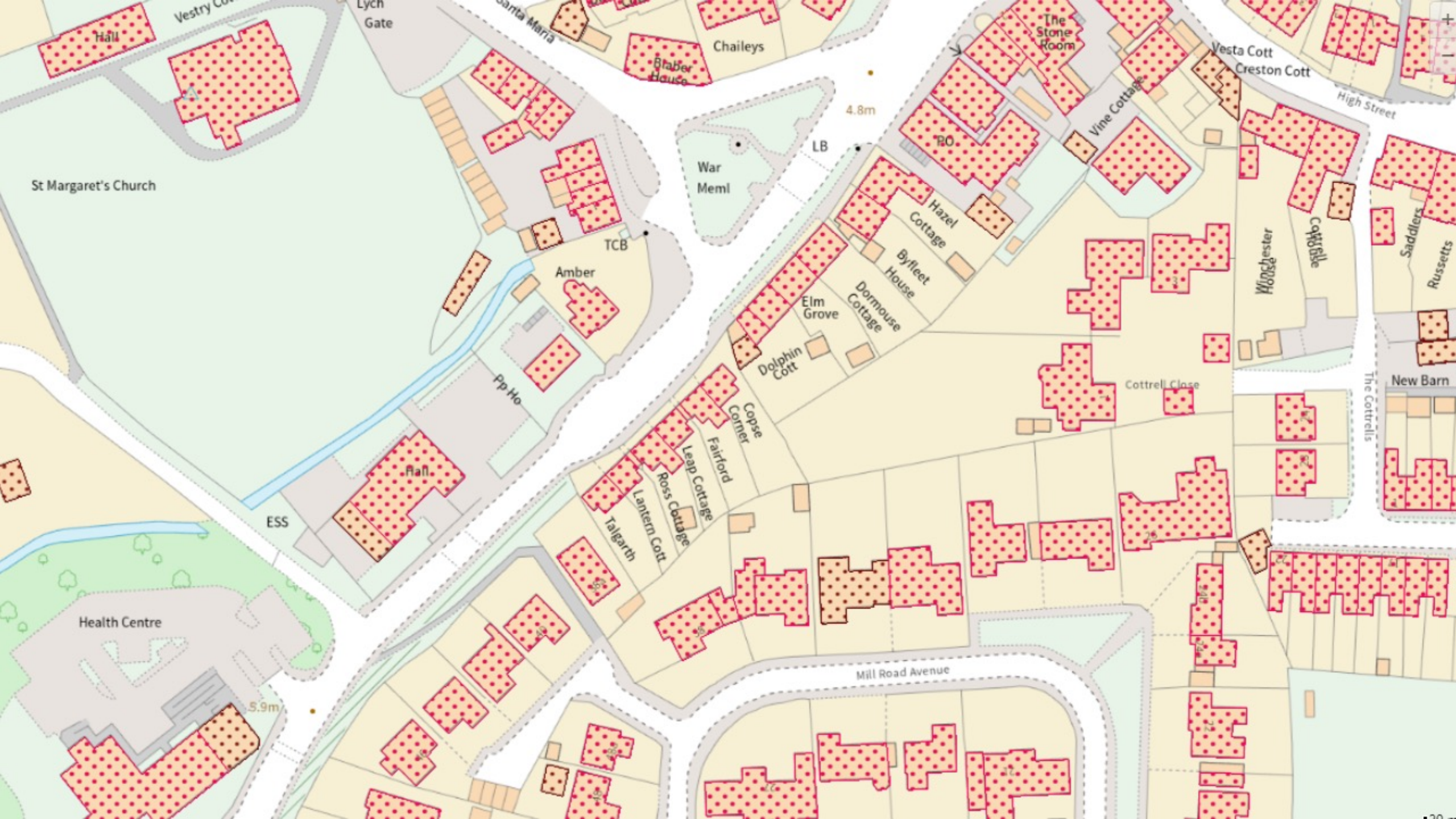
East Preston Rooftop Solar PV

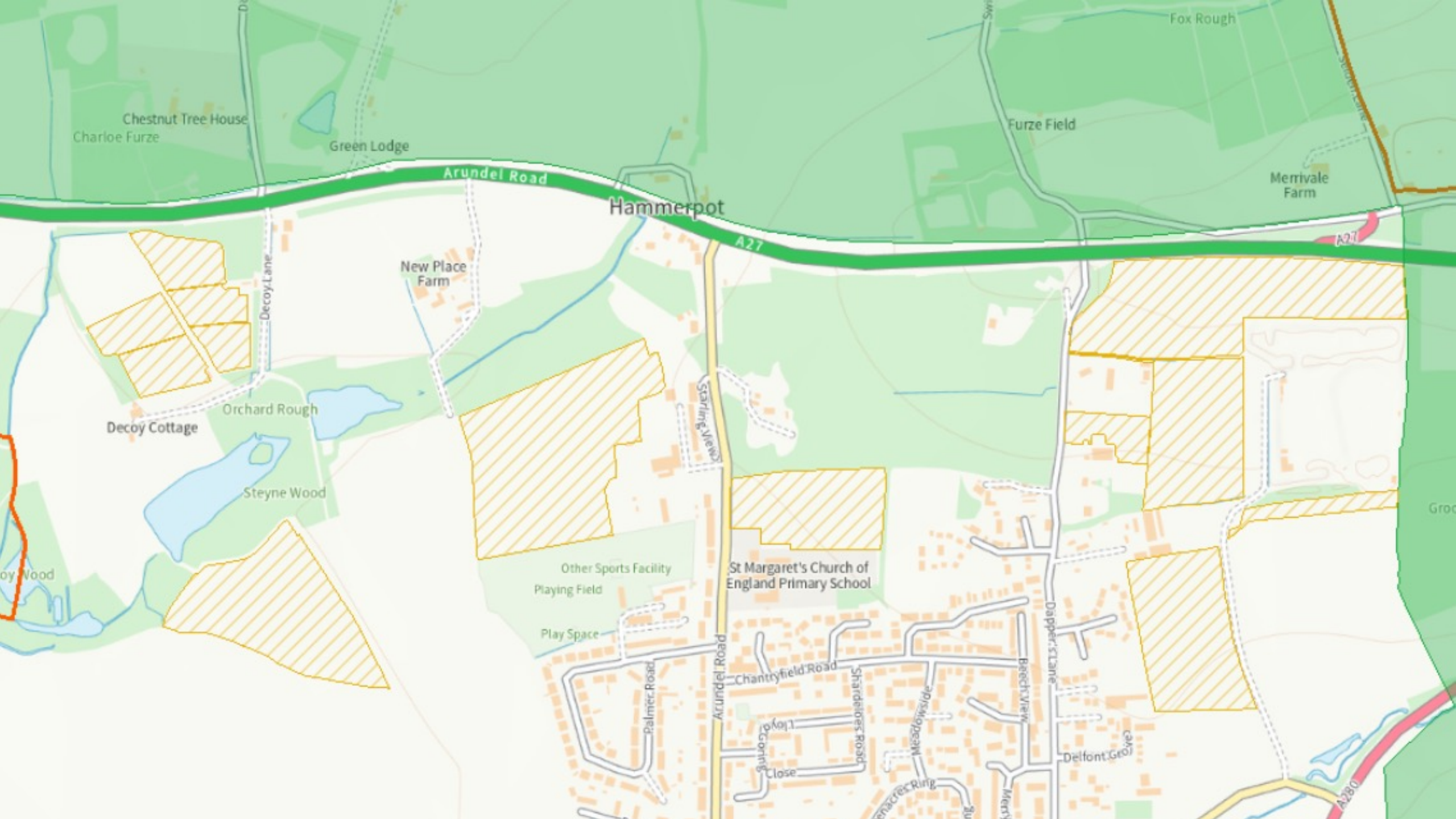
View Mode: Default

Show: ID, Fid Build, F...

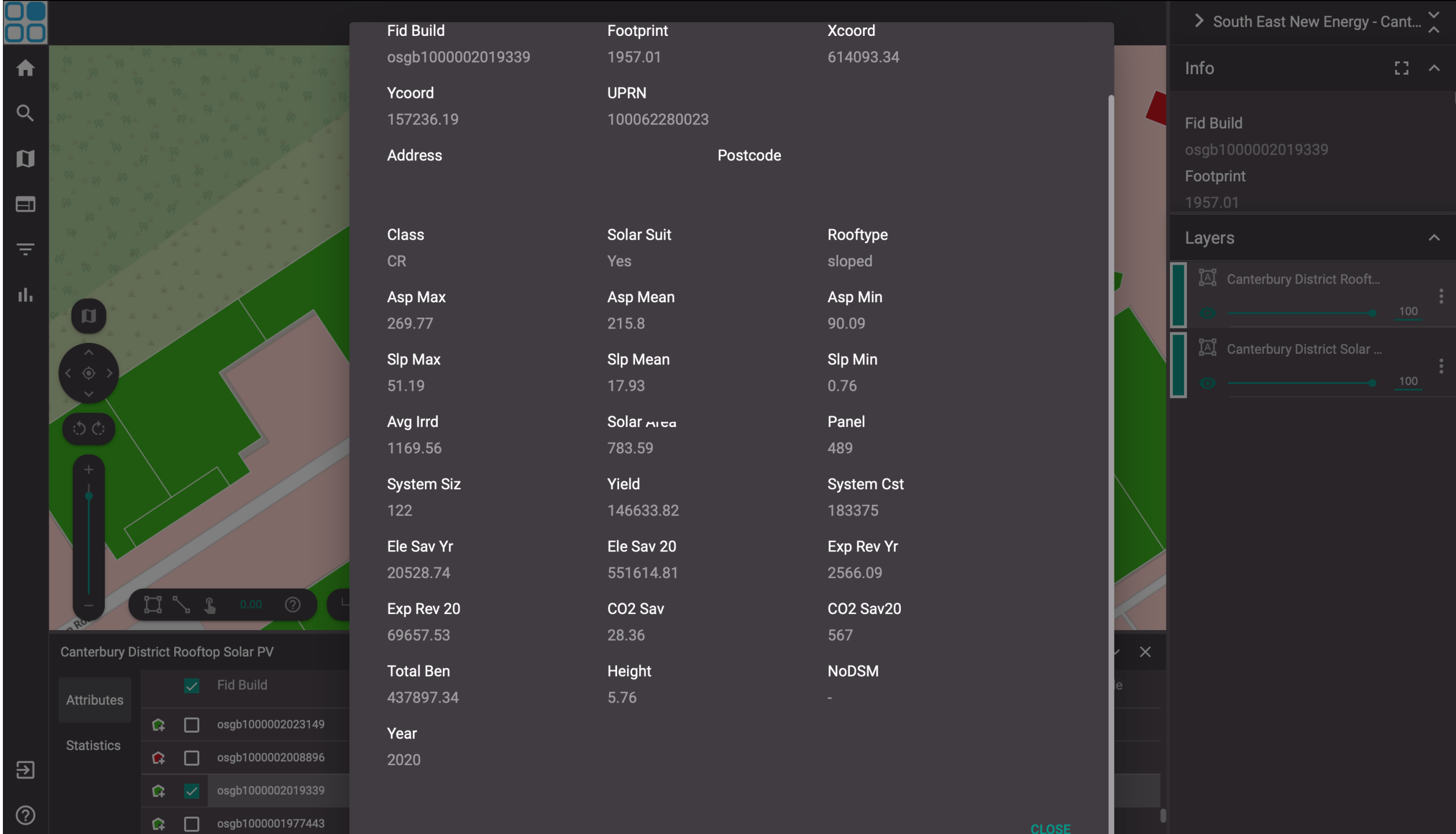
Attributes

Ghi Min	Solar Area	Panel	System Siz	System Cst	Yield
379.77	41.14	25	6	9375	7035.65


Hall
Vestry
Lych Gate
Chaileys
Braber House
The Stone Room
Vesta Cott
Creston Cott
High Street
4.8m
LB
War Meml
RO
Vine Cottage
St Margaret's Church
TCB
Amber
Hazel Cottage
Byfleet House
Elm Grove
Dormouse Cottage
Dolphin Cott
Pp Ho
Hall
ESS
Copse Corner
Fairford
Leap Cottage
Ross Cottage
Lantern Cott
Talgarth
Winchester House
Cottrell Close
Saddlers
Russetts
New Barn
The Cottrells
Health Centre
5.9m
Mill Road Avenue



Fox Rough
Chestnut Tree House
Charloe Furze
Green Lodge
Furze Field
Arundel Road
Hammerpot
Merrivale Farm
A27
New Place Farm
Decoy Lane
Orchard Rough
Decoy Cottage
Starling View
Steyne Wood
Other Sports Facility
Playing Field
St Margaret's Church of England Primary School
Play Space
Palmer Road
Arundel Road
Chantryfield Road
Shardeloes Road
Meadowside
Beech View
Dapper's Lane
Delfont Grove
Close
A280

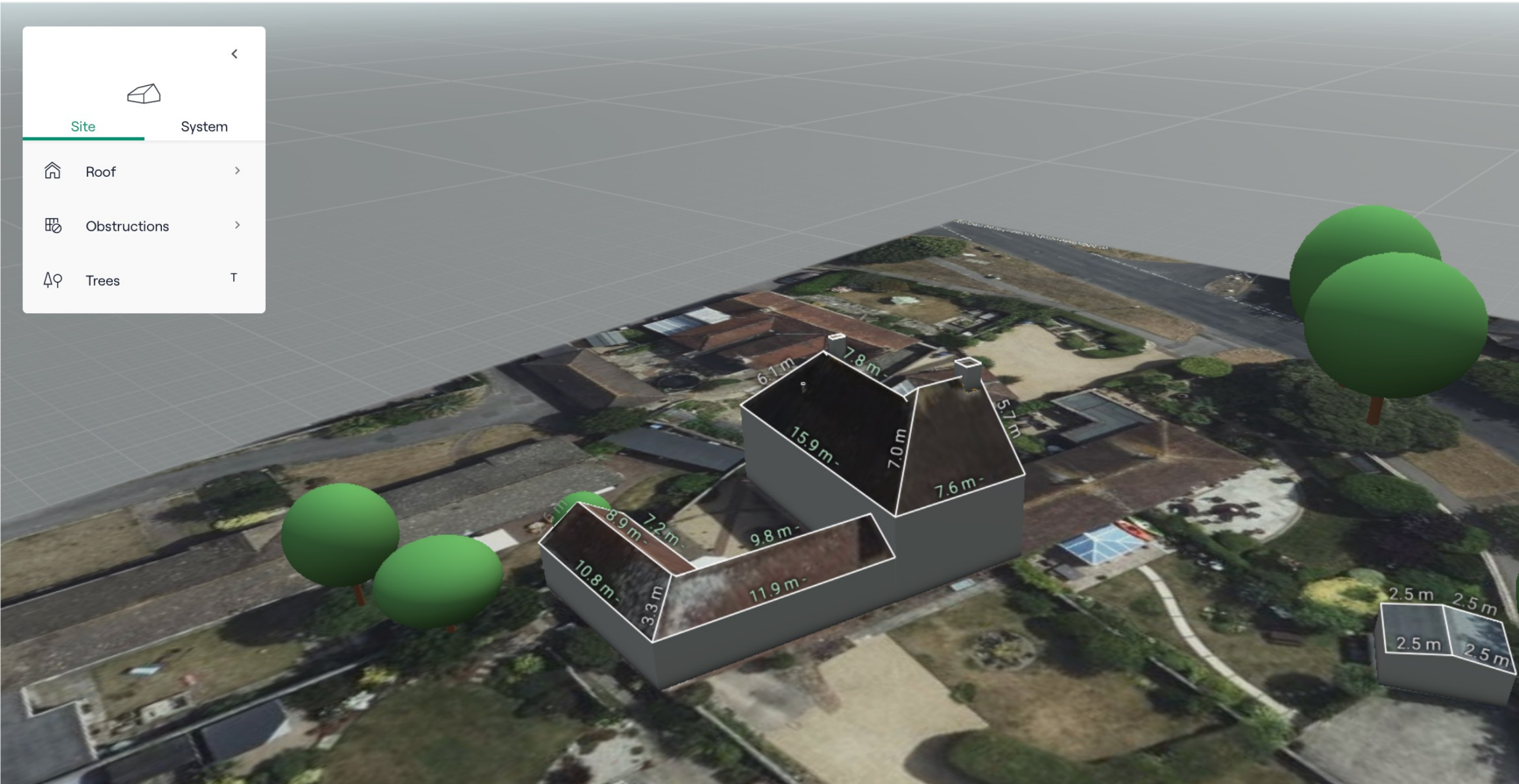

Fid Build
osgb1000002019339
Footprint
1957.01
Xcoord
614093.34
Ycoord
157236.19
UPRN
100062280023
Address
Postcode
Class
CR
Solar Suit
Yes
Rooftype
sloped
Asp Max
269.77
Asp Mean
215.8
Asp Min
90.09
Slp Max
51.19
Slp Mean
17.93
Slp Min
0.76
Avg Irrd
1169.56
Solar Area
783.59
Panel
489
System Siz
122
Yield
146633.82
System Cst
183375
Ele Sav Yr
20528.74
Ele Sav 20
551614.81
Exp Rev Yr
2566.09
Exp Rev 20
69657.53
CO2 Sav
28.36
CO2 Sav20
567
Total Ben
437897.34
Height
5.76
NoDSM
-
Year
2020
CLOSE
South East New Energy - Cant...
Info
Fid Build
osgb1000002019339
Footprint
1957.01
Layers
Canterbury District Rooft...
100
Canterbury District Solar ...
100
Canterbury District Rooftop Solar PV
Attributes
Statistics
Fid Build
osgb1000002023149
osgb1000002008896
osgb1000002019339
osgb1000001977443

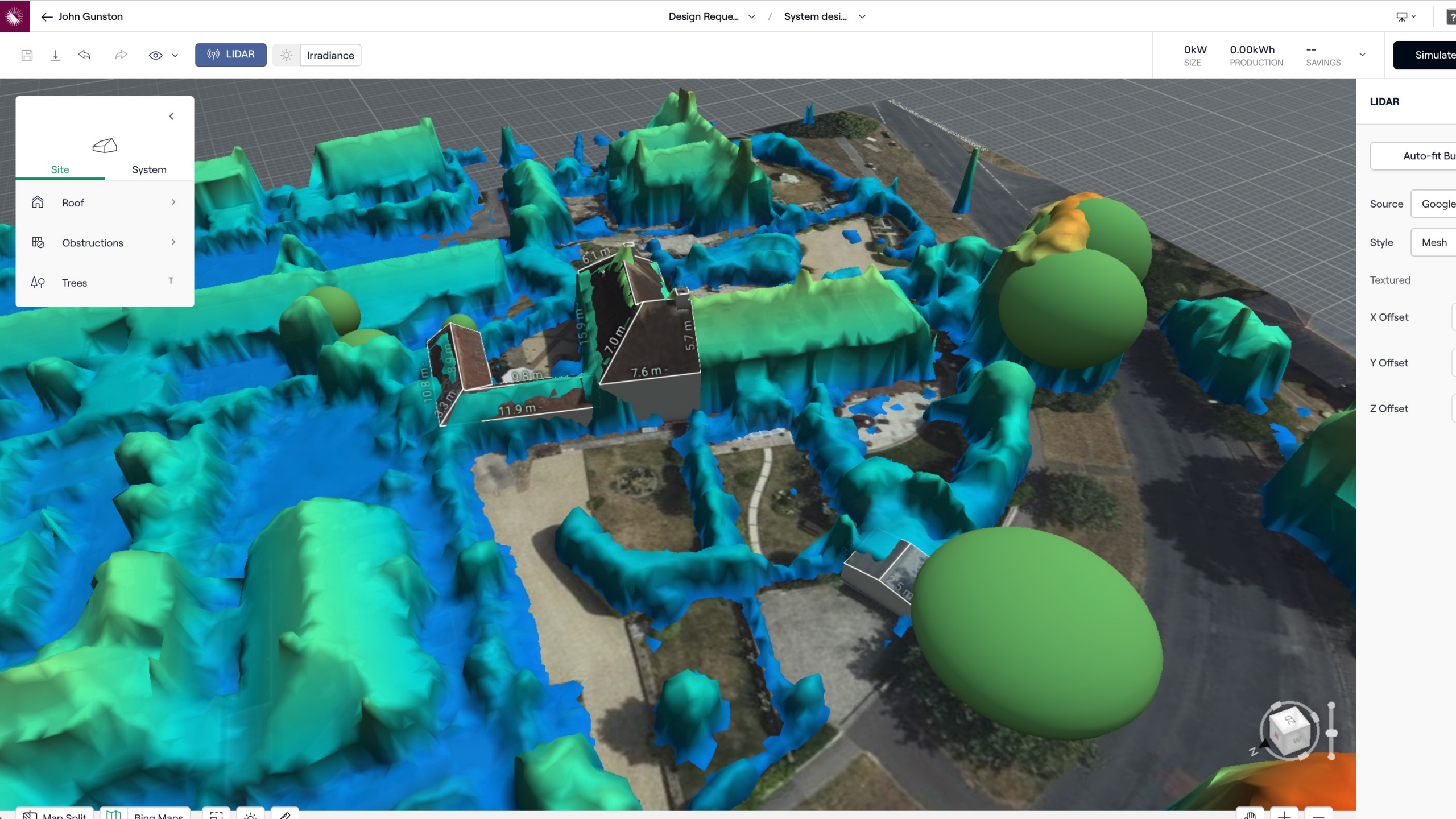
Attribute Name	Description
FID_Build	– Unique Roof Identifier
X COORD	– Geographical Position in OSGB projection coordinate
Y COORD	– Geographical Position in OSGB projection coordinate
Address	– Address as provided by Ordnance Survey
Postcode	– Postcode as provided by Ordnance Survey
Class	– Building class as provided by Ordnance Survey
ROOF_TYPE	– Type of roof on a building, defined as either Sloped or Flat
SOLAR_SUIT	– Is the roof suitable for a solar installation? If not, this field is left blank
Asp_mean	– Mean direction of the roof aspect from north (0) in degrees
Asp_max	– Maximum direction of the roof aspect from north (0) in degrees
Asp_min	– Minimum direction of the roof aspect from north (0) in degrees
Slp_mean	– Mean angle of the roof slope from horizontal (0) in degrees
Slp_max	– Maximum angle of the roof slope from horizontal (0) in degrees
Slp_min	– Minimum angle of the roof slope from horizontal (0) in degrees
AVG_IRRD	– Estimated annual solar irradiation received by the building based on location and roof aspect & pitch (kWh/m2/Year)
SOLAR_AREA	– Suitable area for solar panels in square metres
PANEL	– Number of panels possible to fit to the measured roof space
SYSTEM_SIZ	– Total system size based on number of panels and individual panel output (kWp)
YIELD	– Estimated amount of productivity possible per roof(kWh) in the first year
SYSTEM_CST	– Estimated price of panel installation per property (£)
EXP_REV_1Y	– Estimated amount of income received from the electricity fed back into the grid over a one year (£)
EXP_REV_20	– Estimated amount of income received from the electricity fed back into the grid over twenty-five years (£)
ELE_SAV_1Y	– Estimated amount of money saved by using generated electricity on site over a one year (£)
ELE_SAV_20	– Estimated amount of money saved by using generated electricity on site over twenty years (£)
CO2_SAV	– Estimated amount of carbon emissions saved over a one-year period (kg/MWh)
CO2_SAV_20	– Estimated amount of carbon emissions saved over a twenty-year period (kg/MWh)
TOTAL_BEN	– Estimated amount of income received after deductions of system costs (£)
No DSM	– 'Yes' if the building requiring analysis was not contained with the LiDAR data
Year	– Indicates the year of capture of the LIDAR data used for the processing

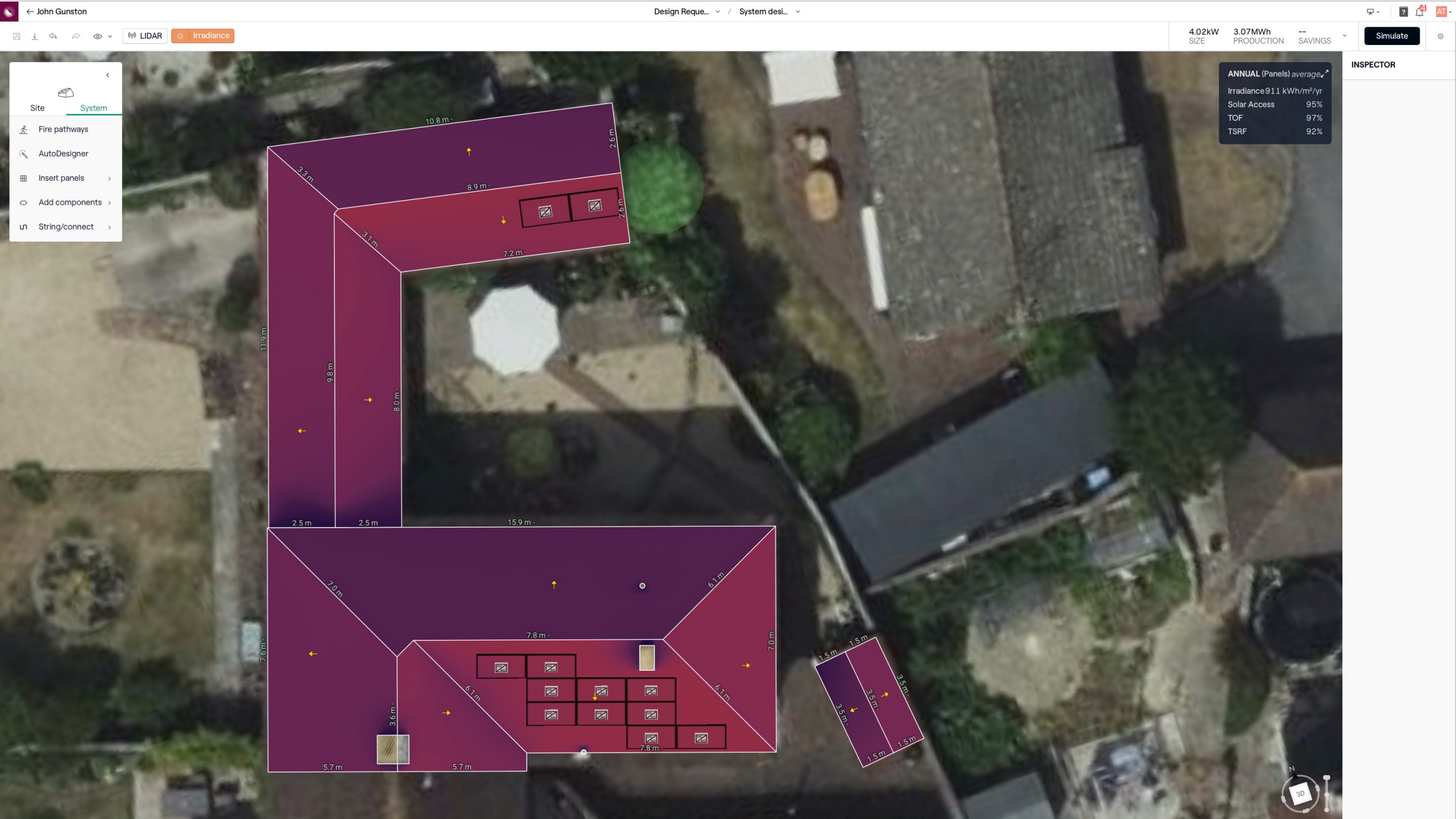
Proceeding to the next stage: detailed analysis of a building

If you decide to participate, we will (as shown over the next 5 slides):

1) Model your roof
2) Assess shading from trees, and buildings
3) Asses the levels of light on the different parts of your roof
4) Come up with a design to maximise generation from your roof
5) If we have your energy bills, do a detailed calculation on the performance of the proposed system


LIDAR
Irradiance
Site
System
Roof
Obstructions
Trees
T
6.1 m
7.8 m
15.9 m
7.0 m
5.7 m
7.6 m
8.9 m
7.2 m
9.8 m
10.8 m
3.3 m
11.9 m
2.5 m
2.5 m
2.5 m
2.5 m


John Gunston
Design Reque...
System desi...
LIDAR
Irradiance
0kW
SIZE
0.00kWh
PRODUCTION
--
SAVINGS
Simulate
Site
System
Roof
Obstructions
Trees
T
LIDAR
Auto-fit Bu
Source
Google
Style
Mesh
Textured
X Offset
Y Offset
Z Offset
6.1 m
15.9 m
7.0 m
5.7 m
7.6 m
9.8 m
11.9 m
10.8 m
3.3 m
8.9 m
2.5 m
Map Split
Bing Maps


John Gunston
Design Reque...
System desi...
LIDAR
Irradiance
4.02kW
SIZE
3.07MWh
PRODUCTION
--
SAVINGS
Simulate
INSPECTOR
Site
System
Fire pathways
AutoDesigner
Insert panels
Add components
String/connect
ANNUAL (Panels) average
Irradiance 911 kWh/m²/yr
Solar Access 95%
TOF 97%
TSRF 92%
10.8 m
2.6 m
3.3 m
8.9 m
2.6 m
3.1 m
7.2 m
11.9 m
9.8 m
8.0 m
2.5 m
2.5 m
15.9 m
7.0 m
6.1 m
7.8 m
7.6 m
7.0 m
6.1 m
6.1 m
3.6 m
7.8 m
5.7 m
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1.5 m
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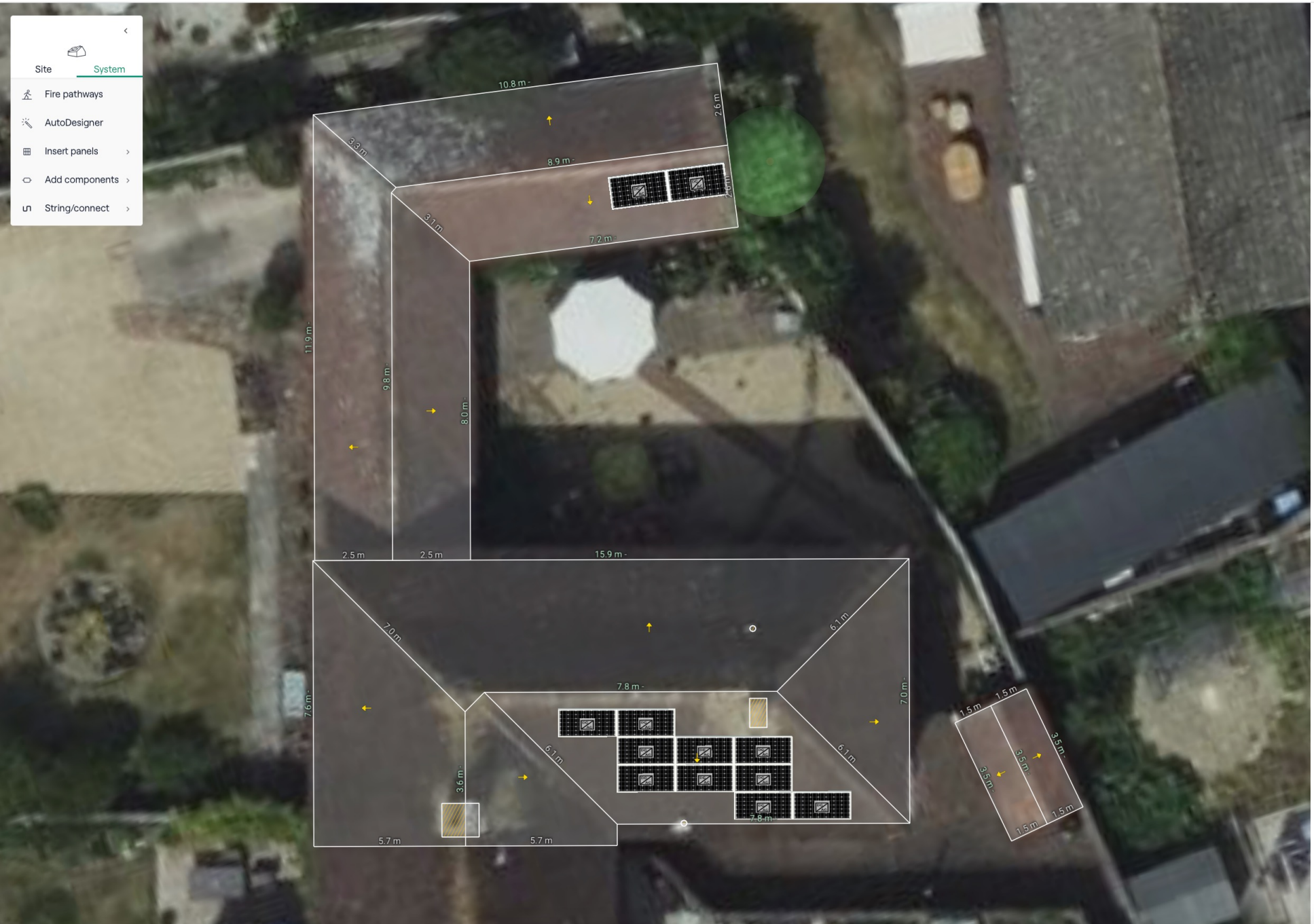
N
3D

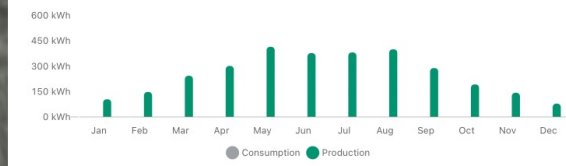


Production | Utility Bill Savings

ANNUAL PRODUCTION

12	3.07MWh	--
Panels	Energy	Energy Offset

MONTHLY PRODUCTION (KWH)



Advanced

Yield
763 kWh/kWp

Performance Ratio
0.891

SYSTEM LOSSES

Irradiance	Total kWh/m²
Irradiance	979
-2.5% Tilt	955
-0.1% Horizon	954
-5.5% Shade	901
-2.0% Soiling	883
0.0% Snow	883
-3.3% Incident Angle	854

DC	Total kWh
After PV Conversion	3,440
-0.9% Environmental	3,411
0.0% Module Rating	3,411
-1.5% Degradation	3,359
-0.5% Connections	3,343
0.0% Mismatch	3,343
-2.0% DC Wiring	3,276

AC	
-3.5% DC/AC Conversion	3,161
0.0% Inverter Clipping	3,161

Other	
0.0% Age	3,161
-3.0% System Availability	3,066
0.0% Other	3,066

Simulation Logs

4.02kW SIZE | 3.07MWh PRODUCTION | -- SAVINGS

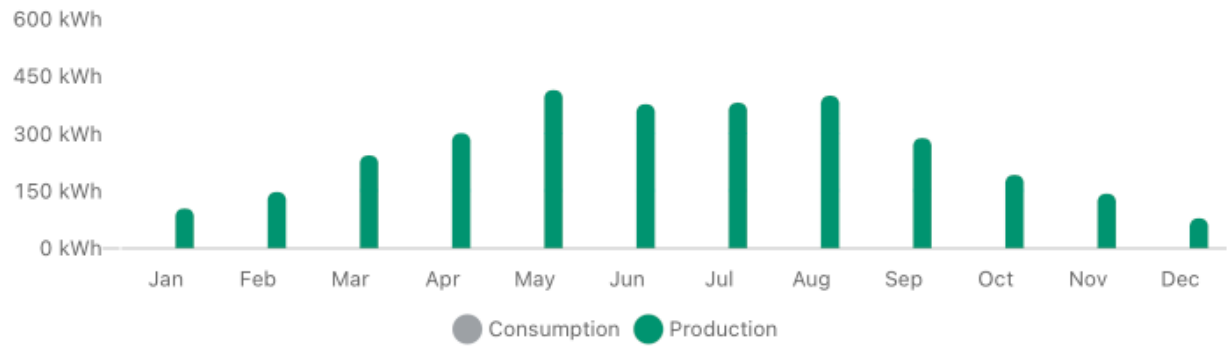
Simulate

Production | Utility Bill Savings

ANNUAL PRODUCTION

12	3.07MWh	--
Panels	Energy	Energy Offset

MONTHLY PRODUCTION (KWH)



Advanced

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Other	
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Simulation Logs

Customer buys the PV/battery

- Provides good mix of price, quality and specification
- Scope for ‘peer to peer’ export of electricity, providing income and helping local energy users without PV
- Scope for extra income for grid services – especially where battery is included

Customer Funded option – projected benefits

Illustrative benefits for capital outlay of £8484. Projected not guaranteed benefits:

- Year 1 saving £1079, payback in 7-8 years, return on investment c13%

Key assumptions

- 4.05 kWp solar PV: £5,485 with a 5.2 kWh battery: £2,999
- Straightforward installation
- Ofgem Oct 23 price cap: 27.35p/kwh for imported electricity
- Energy prices rise with inflation – assumed long term at 3%
- Annual electricity use assumption 3121kWh
- Export of unused electricity at 10p/kWh (NB current SEG offers: 12p best unrestricted offer)
- Note: Also scope for further savings from Demand Flexibility Service

Pay As You Go option

- Expressions of interest now – needs scale
- Details being finalised over next few months.
- Target for start: Spring 2024
- Likely approach:
  - Electricity bill saving of around 10-25% on current assumptions.
- Pay As You Go option likely to be phased starting with solar PV.

Peer to Peer Trading potential

- What is peer to peer trading?
- Two levels: managed market and general market. Managed market brings bigger benefits but needs scale
- Managed market: need to bring together a large volume of generators (selling electricity) and consumers (buying electricity) – around 1,500-2,000 homes would need to participate as consumers.
- General market: small number of households can participate.
- Customer benefit illustration for a sample home in Essex: Annual cost of £786 giving a saving of £147 on a bill of £933. Assumes Ofgem typical consumption of 2700 kWh
- The saving comes from a very low standing charge 8.4p/day not from the volumetric charge. This can benefit any household, especially those with low consumption.

Expressing your interest

To express an interest in participating in the East Preston Community Energy scheme, contact:

Cllr. Alan Evans

alan.evans@angmering-pc.gov.uk

Alex Templeton

alex.templeton@communityinfrastructure.co.uk