Appendix 1 | Energy Analysis | Solar PV assessment

Braunton Parish Council

Rural Community Energy Fund

Stage 1 assessment

Solar photovoltaic assessment

This appendix assesses the viability of sites in the Braunton parish for solar photovoltaics (PV).

Solar photovoltaics (PV) generate electricity from sunlight and can be used to reduce daytime electrical demand from sites. When the solar panels are generating electricity, the site draws less energy from mains supply. If the panels are generating more than the site is using, the system exports the excess to the grid.

PV panels require little maintenance, suitable for incorporating into the built environment and have a relatively low visual impact.

When considering whether solar PV was suitable for sites in and around Braunton several criteria were considered. These included:

- Roof orientation - as near to south as possible is best for an all-round generation profile. In some instances an east/west split of panels is workable if the site has electrical demand earlier and later in the day.
- Roof vs ground mount – roof mounted systems are cheaper and more likely to obtain planning consent. Ground mounted systems, if located sympathetically, can be a viable option for private wire connections into sites with no available roof space. Ground mount systems are more expensive due to the need for frames and greater lengths of cable.
- Shading – shading of solar panels can affect their performance significantly.
- Roof condition – a roof needs to be structurally sound. If the roof condition is such that it will need replacing during the return on investment period of the solar panels, then it is very likely that the system will not be viable.
- Site energy demand – for solar panels to be effective there will need to be daytime electrical demand on the site. At present storage technology is not at a stage to be practically or financially viable for community solar PV.

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Lobb Football Field

Figure 1 Lobb football playing fields

The football playing fields are owned by the Parish Council and are located on the Saunton Road to the west of Braunton. The football club that leases the land is broadly supportive of a community energy project – the club is very popular in the local community and has over 400 members.

The football field can be seen highlighted in Figure 1 above. The site consists of football pitches and a club house. The club house has electrical demand from lighting and kitchen equipment and oil demand from the boiler which provides space heating and hot water for the showers.

Energy costs for the club house are shown in the Figure 2 below (based on figures supplied by the clubhouse).

Figure 2 Football club annual energy usage

Fuel Type	kWh	Cost £	CO_2 – kg
Mains electricity	14525	1743	6507
Heating Oil	19720	1056	5127

The most suitable renewable energy option at the site is for either a ground or roof mounted solar PV array. A system could be sized from 30-200 kWp – dependent on whether ground or roof mounted and what

Western Power Distribution (WPD) and the local planning authority would allow. There is insufficient heating demand for a wood fuel heating system to be cost viable.

A ground mounted solar PV system could be installed along the northern boundary of the playing fields. This would allow for a larger installation of solar PV panels, with 200 kWp being the upper limit of what could be accommodated on the site without encroaching on the amenity value of the pitches. A smaller roof mounted system could be mounted E/W on the club house and would be smaller at approx. 30 kWp.

The proposed solar PV systems (either the ground mount or roof mounted system) could be connected via private wire into the football pavilion and the nearby Lobb campsite. The Lobb campsite has significant electrical demand (£20,000 – 170,000 kWh a year). Much of this demand is during the sunnier months from electrical hook ups when the site is busier. The generation from the solar PV system would reduce the mains electrical demand from the campsite and the club house.

An east/west split roof mount on the club house roof could fit the electrical demand profile from the camp site, with generation earlier and later in the day matching site users getting ready in the morning and returning from days out in the evening.

Generation could be sold to the Lobb Campsite to reduce their electrical costs. The owner of the campsite is keen to be involved in a community energy project and has indicated they would purchase energy from a project at a price discounted from their current price.

A proportion of the generation from the sales could also be used to reduce the football clubs electrical and heating costs.

There is also the possibility of connection to the South West Water pumping station to the SE. At present it does not have sufficient demand – however with increased local development its electrical demand may increase and therefore is a potential future connection for a larger array. This pumping station is circled in Figure 3 below.

There are three phase grid connections at both the football club and the campsite.

Due to the fact the ground mount system would be located along the northern boundary of the site, and its size, it would not meet permitted development criteria. The roof mounted system would be permitted development.

Solar PV at Lobb football club

The google earth image below shows the configuration of a potential ground mounted solar PV system at the Lobb Football Club site. Blue indicates a 200m length system, and the green a further 200m added length, giving a total of a 400m run of panels. The black line shows the run of cable from the system to the connection point at the Lobb Campsite shower block.

Figure 3 Lobb ground mount system

The ground mounted systems would take up a small proportion of the land area behind the dug outs to the north of the football pitches. They could be configured and sited so as not to affect the use of the football pictches and have minimal visual impact on the site.

Figure 4 below gives an indication of the area that a ground mount system would occupy. The idea would be to have the panels two high, in a line along the northern boundary of the site. This is a guide only as each installer will use their own frame mounting system with slightly different ground footprint.

Figure 4 Ground mount system configurations

System Size kWp	Number of Panels	Area m^2
50	200	288
100	400	576
200	800	1152

Ground Mount Systems – approximate dimensions

System Size & Configuration	GMS length - m	GMS depth - m	GMS height - m
50 – 1 panel high	200	1.5	1.2
50 – 2 panel high	100	2.5	1.8

100 – 1 panel high	400	1.5	1.2
100 – 2 panels high	200	2.5	1.8
200 – 2 panels high	400	2.5	1.8

The images below give an indication of the visual impact of a ground mount system of this size (two panels high max).

Figure 5 Example of ground mount systems

Figure 6 space available for ground mount

Figure 6 shows the width of the area available for a ground mount system at the northern field boundary. There is at least 10 metres to the pitch edge. The solar panels would fit adequately in the space behind the dug outs, far enough from the pitch not to affect the use of the football pitches.

The main potential areas that would be visually impacted by a ground mount system are the properties running along the lane to the north of the site and the main Saunton road, running along the south of the site. Visual assessment has shown that the dug outs in the football field cannot be seen from either location from cars, pedestrians and cyclists; at the height of Google Earth imaging cameras (around 8 feet or 2.4m), the panels can be seen from the Saunton Road when the hedge is low.

Figure 7 Visual impact overview

Figure 7 above indicates the two main lines of site that could be visually impacted by a ground mounted solar PV system along the northern boundary of the football site. To a large extent the hedge lines to the north and south would obscure the proposed solar system. The hedge will occasionally be flailed, but the height will still be sufficient to obscure the approximate 1.8m height of the system. Photos were taken at both of these indicated points, to demonstrate the lack of visual impact.

Figure 8 Image from elevated position in lane above Lobb playing field

Figure 9 Image from elevated position on Saunton road

The photos in Figures 8 & 9 above clearly show that the hedgerow would obscure any ground mount system from the main Saunton road. In Figure 10 the dug outs can be seen on the left hand side of the gateway, highlighted. The solar panels would be lower in height than these dug outs, and would thus be hidden from view. They would only be visible directly through the gateway.

Even after flailing/cutting, the hedgerow height should be sufficient to obscure the panels from the height of most passing vehicles and pedestrians/cyclists.

Figure 10 Ground mount panel location from Saunton road gateway

If it is decided that a ground mounted system has too much of a visual impact then there is the opportunity for a smaller system to be roof mounted on the pavilion. This would be easier to achieve planning permission for (planning permission may be required as one of the roof aspects faces the road and is in a sensitive area – AONB – but is likely to be permitted development as technically it would not face the road).

The smaller roof mounted system would be cheaper to install than ground mount. The cable runs to the meter at the campsite would be a little longer.

A roof mounted system on the pavilion would accommodate approx. 30 kW of panels, depending on type used. The installation would be an E/W split (slight orientation to SW and NE). With the usage profile at the campsite this could be a positive thing. The electrical demand is likely to be earlier and later in the day. An E/W split on the panels would shift production from the panels to earlier and later in the day, meeting the campsite's demand.

Figure 11 & 12 below shows the western roof space available on the football pavilion. The roof condition is good and there is little roof furniture. Mounting panels on both eastern and western roof aspects would be a simple installation and the building is a single storey. Access to the site is good. In summary, the roof mount system would be a simple solution, for which it would be quick to obtain consents and install.

Figure 11 Football pavilion roof space

Figure 12 Football pavilion solar PV options

Small arrays could also be mounted on the roof spaces available at the Lobb campsite if ground mount is not an option. This would increase the installed capacity of the roof mounted systems. It would enable another 10 kWp of solar panels to be roof mounted.

In summary the Lobb football playing fields and Lobb campsite offers an opportunity for ground or roof mounted solar PV systems with good daytime usage from the campsite during the summer months.

Caen Street Car Park

Figure 13 Caen street car park area

The Caen street car park area is highlighted in Figure 13 above.

There are several buildings used by local organisations on this Parish Council owned site. The PC owns the buildings which the organisations lease on long term agreements. Buildings on the site include:

- Braunton Museum
- Countryside Centre
- Wensleys Newsagents
- British Surf Museum
- Caen Surgery – not owned by the PC
- Police Station – not owned by the PC
- Toilet Block

Micro energy audits were carried out for the buildings willing to participate and are included as appendices.

The medical centre will have high electrical demand. However it has not been possible to obtain access to the building or energy usage information.

Solar PV could be building mounted on to the surf museum, countryside centre and museum (smaller system). All of these buildings have daytime electrical demand and there is the scope to supply discounted electricity from roof mounted solar PV systems. The schemes would be small in the context of a community energy scheme – they would not generate significant revenue compared to the costs of development. Generally community energy solar schemes are most financially viable over 30 kWp in size.

Solar PV mounted on a framework covering the car park spaces is technically possible, with private wire connections into the buildings surrounding the car par. However the current costs (approximately £290k for 100 kWp) of such a scheme make this a less attractive option, and not financially viable at this point in time. If the costs of framework for such a project drops significantly then such a scheme may become financially viable.

The solar PV projects on the buildings around the Caen car park are likely to be permitted development. However the planning authority should be contacted at the outset of any project development.

Surf Museum

The surf museum has a mix of south, east and west facing roof space. The roof is in average condition and the current lease holder feels the roof needs replacing/repair before solar panels could be installed.

Figure 14 Surf museum roof area

The building has enough area on the south facing portion (marked) of the roof for 4 kWp of solar panels. This roof currently suffers shading from the trees to the west, especially when the sun is lower in the sky. This would affect the systems performance.

If the roof does need a re-roof or its condition improved, this should be carried out before any solar panels are installed. To remove the panels and replace them after installation would significantly affect the financial viability of any project.

Figure 15 Surf museum east facing roof

The site’s single phase grid connection would support no more than 4 kW, unless WPD agreed to a larger capacity. A system could be limited by the inverter, with larger capacity of solar panels being fitted. This would increase the production from the system. This option would require mounting of panels on the eastern roof space as well.

Figure 15 shows the eastern roof space of the surf museum. Further panels could be mounted to the east/west facing roof spaces to increase generation, limiting the output of the system by the inverter capacity. There is currently some shading from nearby trees. The larger trees to the west can also be seen on the left hand side of this photo.

Figure 16 surf museum south and west facing roof

The south and west facing roof spaces. These are currently shaded by tall trees to the west.

In summary, the surf museum has sufficient roof space and grid connection capacity to support a small 4 kWp roof mounted solar PV system.

Museum

The museum does have a small area of south facing roof space. Taking into account planning guidelines on siting of panels the museum would be able to install approx. 2-3 kWp of solar panels (with some panels mounted on the west facing aspect and a higher capacity of panel used).

Figure 17 Braunton museum roof area

The museum can be seen in Figure 17 above. The eastern section of the roof does not all belong to the museum – a third of the roof is part of the pub next door.

The main section of the building has the capacity to mount solar panels on the southern and western facing aspects. However the available roof area is small. The eastern end of the building has a small section of south facing roof, and it would be difficult to mount panels in portrait here. They would likely have to be mounted in landscape, reducing the number of panels.

Figure 18 Museum roof area

In summary – the museum is not an ideal building on which to mount a community solar PV system. The system would be small, with installation and equipment costs being high relative to the installed capacity and revenue from the development.

Wensley Newsagents

This building is not suitable for the installation of solar PV. The roof is too small and it is heavily shaded. There is no scope for solar PV of any size.

Caen Surgery

This building is suitable for 4 kWp+ of solar PV, depending on its grid connection. However it was not possible to gain access to site or energy use information, despite several attempts being made, as the surgery were unwilling to take part in the RCEF project.

Caen Toilet Block

The toilet block does have a south facing roof space. This could accommodate several solar panels. There will be some daytime electrical demand from hand driers and hot water. A small solar system could help offset this demand. Although not a viable community scale project, the system could be worthwhile for the council to pursue as a stand-alone project. The roof would accommodate around 1 kWp of solar panels due to roof furniture and small roof area available.

Vivian Moon Centre

Figure 19 Vivian moon centre roof area

The Vivian Moon centre has a south facing, unshaded roof space in good condition. Figure 19 shows the roof area available for solar panel installation.

The site has a single phase grid connection that would support solar PV capacity of just under 4 kWp. The roof space could accommodate more solar panels than this, and so there is an opportunity to add a higher capacity of solar panels, and limit the output to under 4 kW with the inverter. This would maximise generation potential.

The building uses approx. 3000 kWh of electricity a year and so does not have high daytime demand. A solar PV system would offset a proportion of the daytime electrical demand from the centre, but electrical usage is not high enough to offer significant savings.

The installation of solar panels would be very simple and the building is single storey.

The main issue with this installation at the Vivian moon is low daytime demand, as solar PV panels become less financially viable if the energy they are generating is not offsetting mains electricity. An option to increase daytime demand for electricity may be to add an electric vehicle charging point. The Vivian Moon is right next to a car park – an ideal location.

Exeter Road Recreation Field

Figure 20 Exeter road recreation ground

The changing rooms already have solar PV installed. There is no scope for additional renewable energy at the site.

Memorial Garden and Shelter on Chaloners Road

Figure 21 Memorial gardens

There is no on site energy demand and minimal roof area for solar panels. Ground mount is not an option at this site.

Anchor Area and Old Railway Line to Georgeham Cross

Figure 22 Anchor area and old railway line

Ground mounted solar would be the only option at this site. A ground mounted system would not be suitable due lack of space, shading from trees and visual impact.

Council Offices and Chamber

Figure 23 Council offices

The building has already installed 10 kWp of roof mounted solar PV – there is no reasonable scope for additional solar PV on the building (due to grid connection limitations).

Car Park on Chaloners Road

Figure 24 Chaloners road car park

The option for solar PV at this site would be solar panels mounted on a framework above the car park spaces and connected into surrounding buildings (Vivian Moon and library).

Solar PV car parking ports are a technically feasible way of integrating solar PV technology with the built environment. They provide shelter for parked cars whilst allowing solar PV to be connected to surrounding buildings via private wire connections.

The high cost of the car park mounted solar PV means that it is not financially viable as a community project at this time. Should the price of solar panels and the mounting frame fall dramatically then the system may become financially viable.

Play areas – Mowstead, Knowle and Chaloners Road

There is no scope at any of the PC owned play areas. There is no energy demand, insufficient space for solar PV and no scope for private wire connection.

Bus Shelters

Solar panels can be mounted to bus shelters. However the amount of energy generated by one or two solar panels is small. There is also no energy demand from the bus shelter and private wire connections to nearby buildings are expensive, relative to the installed capacity of the solar panels.

Systems can be linked to battery powered LED lighting systems. However these are expensive for the amount of energy offset by the system. They are predominantly used in locations where there is no grid connection. They would not be a viable community energy project.

The Beacon

There are no buildings for roof mounting of solar PV at the Beacon site. Being in a prominent location and being a green space, there is also little scope for ground mounting of solar panels. There are also no obvious private wire connections available. Solar PV is therefore not viable at the Beacon.

Velator Quay

Figure 25 Velator quay

The Parish Council own a sliver of land at Velator Quay, including a small car parking area.

The area is shown above in Figure 25. There is little energy demand in the local area, other than the small industrial unit to the west of the quay.

There is no scope for solar PV due to the limited space and potential visual impact. A wind turbine would be effective at the site, but the visual impact and proximity to Chivenor airbase rules this option out.

South West Water pumping station, Velator

The pumping station located on Velator Road has a significant year round electrical demand. With little in the way of building infrastructure and land for the installation of solar panels at the pumping station itself, this site could utilise solar panels mounted on a nearby building as part of a community project.

The Home Hardware building on the nearby industrial estate was investigated as it has a large south facing roof space. However the company plans to re-roof the building in the near future which rules out solar panel installation.

The Tiki building was also investigated, but it is in very poor condition and the owners are planning to re-develop the site when funds allow.

The other industrial units suffer from the same issues.

The newer Salt Rock building has an unsuitable roof for mounting sufficient solar panels.

There is an agricultural building in very good condition, with a suitable roof space, to the east of the SWW site. This building is owned by a local family, who are positive about the potential for solar PV being mounted as part of a community development. The building is an easier connection to the pumping station, as it crosses no roads or watercourses.

The barn has roof area for 50 kWp of solar panels. There is also room to ground mount further panels on the site, up to approx. 100 kWp of capacity. A 50-100 kWp system is required, as this is the minimum size that might interest SWW in terms of energy offset. The ground mounted panels could be sited to the west of the main building.

There is significant energy demand from the SWW site. Annual consumption is high and has peak demand of 122 kW.

The generation from solar PV should match reasonably well the energy usage from the SWW site, as visitor numbers increase the energy demand on the site during the summer months.

The grid connection would be via a private wire connection to the SWW site. This would require a cable run across the marshland. The cable could be run along the northern boundary of the field and then down to the SWW site.

Figure 26 SWW Velator solar PV system

Planning permission would be required for the ground mount system and it is likely it may also be required for the roof mount, due to the proximity to the nearby marshland which forms part of the protected landscape.

Home Hardware

The Home Hardware building on Velator Way has a south facing roof space with space to accommodate approx. 100 kWp of solar panels.

Although it is an excellent potential orientation for mounting solar panels, the building itself has low energy demand – it is mainly used for storage. The business that owns the building intends to replace the current roof in the near future, and this makes installing a solar PV system unfeasible.

It would be worth approaching the site again in the future, once a new roof has been installed.

Figure 27 Home hardware roof area

Tiki Surf International

The Tiki building on the Velator industrial estate has the roof area capacity to mount approx. 30 kWp of solar panels. However the building is in poor condition and the roof is not likely to last the 20 years necessary for a viable community energy project.

Figure 28 Tiki roof area

Salt Rock

There are two Salt Rock buildings on the industrial estate. The newer building, which incorporates office space, has a curved metal roof which is not ideal for mounting solar panels onto due to expensive installation.

The other Salt Rock building is much older with an east/west split. The poor condition of the roof and orientation of the building make this a poor option for installation of solar panels.

The business itself, and ownership of the buildings, would be difficult to guarantee for the 20 years necessary for community development. These buildings are therefore not an ideal option for community energy development, as they are high risk.

The other buildings on the industrial estate also have roof space in poor condition with an east/west split, which are unsuitable for solar PV development.

Braunton Academy

An approach was made to Braunton Academy in regard to the main college site and also the athletics track, which the Academy own.

The college itself already has 34 kW of roof mounted solar PV. This is a combination of a 30 kW system on the Isaac Hall and 4 kW system on the main school.

The college have an indication from WPD that the site will support another 22 kW of solar PV (in terms of what they will accept for export).

The college has more than sufficient roof space left for an array of this size with options for a number of panel configurations. .

Figure 29 Braunton academy roof area

The additional 22 kW could be mounted on the remaining south facing pitched roof space of the quad buildings, connecting into the main school meter. This would reduce cable run.

The meter location for the building can be seen as a blue dot in Figure 29. It would be best to avoid any of the flat roof spaces, as the framework required will raise the installation costs and reduce the potential return on investment.

An option for the site would be to split the additional solar PV on to S/E/W orientations. This would help to produce more energy at the start and end of the school day. This can be a good match with a school's energy demand, especially the eastern facing array as schools can have an energy demand spike at the start of the day when appliances and lighting are all switched on.

There is significant daytime electrical demand from the college and an annual electrical demand of approx. 230,000 kWh. This would mean that any additional solar capacity would still be mainly used on site. The current 30 kW solar PV array is mounted onto Isaac Hall, which is a separate meter.

Braunton Athletics Track

Braunton Academy also owns the nearby athletics track. There are several buildings on the land, and these are owned by North Devon Athletics Club.

There is little on site daytime electrical demand. However the athletics track is nearby to Southmead primary school. It would be feasible to mount solar panels onto either the roof space, or ground mount them, and connect in via a private wire to the school. The school has significant energy demand – an annual demand of some 50,000 kWh. This would allow for a larger system to be connected to the school than their current roof could support (pending WPD approval).

The site could support ground or roof mounted solar PV. The systems would have a good southerly orientation with no shading issues. A ground mounted system could be sited on the northern boundary of the site, flush against the fence.

Panels could also be roof mounted on the athletics club house and spectator stand. The roof mounted option would be cheaper to install and easier to obtain planning consent. Figure 30 shows the different panel configurations possible.

The solar panels would require planning permission for the ground mounted system. The roof mounted system may be deemed permitted development – a pre-application enquiry should be submitted.

Figure 30 Braunton athletics track roof and ground mount areas

Figure 31 shows the scrub where ground mounted panels could be situated without losing any used space.

Figure 31 Athletics track ground mount area

Figure 32 shows the boundary of the site along which further panels could be situated. The height of the system mean it could not be seen by the houses to the north of the site.

Figure 32 Athletics track ground mount area

The ground mounted system would need to be fenced for safety and security. This would add to the cost of the system.

Southmead School

Southmead primary school is located near to Braunton Academy. The school has an annual electrical demand of approx. 50,000 kWh.

The school lacks a good south facing roof space, though does have several buildings with flat roof spaces that could be utilised. This would require framework for installation adding to cost. The roof of the main building could accommodate solar PV, but it would be a more complicated and therefore expensive installation.

Figure 33 Southmead roof area

The roof of the building can be seen in Figure 33. An installation on the main roof would be expensive due to the number of panel configurations required. The flat roof on the main school has a significant amount of roof furniture, which makes solar PV installation difficult.

The flat roof buildings to the south of the main school offer an alternative roof mount option. These flat roofs have sufficient space for approx. 20-25 kWp of panels. However they would need frames and the varying condition of the flat roofs would add risk to any installation. The most southern outbuilding has a curved roof, on to which it would be difficult to install.

Figure 34 Southmead main school roof

Figure 35 Southmead main and flat roof

Figure 35 shows the southern end of the main building and the flat roof of the Devon Lady type classroom buildings.

These flat roof buildings could support roof mounted solar PV, but would need a frame system that would increase cost. The flat roof of the buildings would also have to last for the 20 year of the FiT

Figure 36 Southmead external classrooms

Figure 36 shows the external classrooms. The building to the very south of the site has a curved roof which suffers some shading from the trees on the site boundary.

Kingsacre School

The primary school has daytime electrical demand during term time and has enough south facing roof space to support 10-30 kW of roof mounted solar PV. Annual consumption of electricity is approx. 50,000 kWh.

The school has several roof spaces with a southerly orientation. A total of 30 kWp could be installed on the school – however this would depend on WPD. A standard 3 phase grid connection would allow 10.5 kWp of roof mounted solar PV. This would be best mounted on the large south facing roof space at the southerly end of the school.

The roof mounted system is likely to be permitted development.

Figure 37 KIngsacre School roof area

Braunton fire station

The fire station does not have enough daytime electrical demand for installation of a system that would be viable for community solar PV.

Figure 38 Braunton fire station roof area

Figure 38 shows the east/west orientation of the roof, which is not ideal for solar PV. The condition of the roof is also average – any re-roofing required would rule out community owned solar PV.

There is sufficient roof space for 4 kWp of roof mounted solar PV. The best configuration would be a split of 2 kW on each side of the roof. However with little daytime electrical demand it would not be a good application of the technology.

Figure 39 Braunton fire station

The southerly and eastern orientated roof spaces of the fire station are shown in Figure 39. Panels could be mounted on both of these aspects as well as the western facing roof. This would give generation throughout the day – however there is little demand to make use of this at the site.

The Black Horse Inn

The pub has little suitable unshaded roof space for solar PV installation and the roof condition is poor.

The red roof in Figure 40 is the most suitable for solar PV installation. This would support installation of 2-3 kW of solar PV. The condition of the roof is average/poor and shaded.

Figure 40 Black horse inn roof

The pub has daytime electrical demand from refrigeration equipment and lighting.

Due to the small size of the roof area, and transient nature of pub ownership, the scheme would be a high risk community energy project.

St Brannocks Church

The church is Grade 1 listed. This rules out any solar PV that can be seen. There is no potential to locate any roof mounted solar PV that cannot be seen from the ground.

St Brannocks Church Hall

The hall does not have an ideal orientation for solar PV. The roof has an E/W orientation. There is not a significant daytime electrical demand, with much of the electrical usage being in the evening.

Figure 41 St Brannocks hall east

These photos show the east and west roof orientations. There is sufficient space to install a 4 kWp roof mounted solar PV system. The single phase grid connection means a max of 4 kW can be installed. Daytime use is, however, not high and the site is not ideal for community solar PV as there would be little in the way of energy usage and sales. The roof condition is average.

Figure 42 St Brannocks hall west

Figure 43 St Brannocks hall roof area

The aerial view of the church hall in Figure 43 shows the east/west roof.

The building to the rear has sufficient flat roof space and grid connection for 4 kW of solar PV. The roof is high, meaning increased scaffold costs, and the flat roof would result in framework being used. This would increase the costs of a small solar PV system. Daytime electrical demand is also low.

Due to low daytime demand the hall is not suitable for community solar PV.

The Agricultural Inn

The public house has a south facing roof space and daytime electrical demand. The south facing roof is in average to poor condition and would therefore not be suitable for community solar PV (if the roof was replaced the panels would need to be removed and re-installed, adding significant cost to the project).

The suitable south facing portion of the pub roof is marked in Figure 44.

Figure 44 Agricultural inn roof area

There is enough south facing roof space for 6-8 kW of solar PV, depending on capacity of panel used. This could reduce the pubs daytime electrical demand significantly.

The poor roof condition and the transient nature of pub ownership and tenancies mean that the pub is not an ideal community solar project. However should the roof be replaced then the business should look to install solar PV at this time, as it would be most cost effective.

Christ Church

The church and hall have south facing roof space that is unshaded. The main south facing roof space is high and in average condition. The hall roof is a more complex design and is shaded by the main church roof.

The site could accommodate approx. 6-8 kW of roof mounted solar PV (depending on capacity of panel used and utilising additional smaller roof) on the south facing roof space. Daytime electrical use is low, so the potential for offsetting electrical costs is poor. The site would need upgrading to 3 phase for larger than a 4 kW system.

With the low daytime electrical demand, high roof and poor roof condition the church is not a good candidate for a community solar PV project.

Figure 45 Christ church roof area

Aerial photo showing the potential location of a solar PV system on the church.

Figure 46 Christ church roof

Christ Church main south facing roof space. Photo illustrates the average condition of the roof.

Braunton Bowling Club

The lawn bowls club house has a large south facing roof space. The club has reasonable daytime electrical demand from lighting and hot water appliances.

The building has a single phase connection which limits potential system size. There is 3 phase near to the site that could be brought in. A cost would need to be obtained from WPD for this work.

Figure 47 Bowling club roof area

Figure 47 shows the south facing roof space and potential location of a solar PV array.

The bowling club is a good site with the potential for an array of some 20 kW of PV (if the grid connection could be upgraded cost effectively). The roof is in good condition and there is daytime electrical demand.

However the bowling club have indicated that they would not like to be part of a community energy project at this time.

Caen Primary School

Set in the middle of the village the main building of this school is Grade 2 listed with a roof that is not ideal for solar PV. It can be seen highlighted in Figure 46 below.

There is already a small solar PV array on the site. The indication from the school is that the current grid connection is insufficient and WPD are unlikely to agree to any further solar PV on the current connection.

Figure 48 Caen school roof area

The other buildings on the school site are either flat roof or with an east/west orientation. This is not ideal for solar PV. The flat roof buildings are unlikely to last the 20 years required.

The sports hall, which could accommodate solar PV E/W, needs to be refurbished or rebuilt. The other building with an E/W orientation suffers from some shading from the main school.

Figure 49 Caen school sports hall

The sports hall building above is in poor condition and needs to be refurbished/rebuilt.

Due to the main school being listed, and the remaining roof spaces being unsuitable, Caen Primary is not a good candidate for community renewable energy.

Cawthornes Foodmarket

The site has installed solar PV.

West Cross Garage

The roof condition of the building is not of a sufficient standard for a community renewable energy project. It would likely have to be refurbished during the lifetime of the solar PV, this would significantly affect the return on investment from a scheme.

West Caen Field Car Park

The owner of the site is looking at solar PV for the buildings around the car park as a private investment.

The White Lion

The pub does have some south facing roof space. It is brewery owned and has had several landlords in the past few years. The roof condition is poor at the moment. There are two south facing roof spaces, one of which is in poor condition, the other is average. These can be seen in the photos below. There is currently space for a 4 kWp solar PV array on the site.

Figure 51 White Lion roof good condition

Figure 50 White lion roof poor condition

The roof in Figure 51 which is in better condition. This would be suitable for mounting of solar panels.

Both roof spaces would be needed to accommodate 4 kW of solar PV.

Businesses on Exeter Road

Of the business buildings on Exeter Road the most suitable for solar PV are the Co-Op building and the building leased by Southfork and Paint-a-Pot. Due to the leasehold nature of these buildings, and uncertainty over business longevity, there is too much uncertainty for a community renewable energy project on these buildings.

Squires does not have a suitable roof space. E/W orientation.

Tesco

Braunton Tesco has very significant daytime electrical demand from chillers, refrigeration, HVAC and lighting.

Several meetings were held with store management and site visit undertaken. The store management asked senior management whether there was any interest in community renewable energy. The response was that if any renewable energy was developed, it would be done in house.

This was disappointing as the roof and energy demand of the Tesco store are ideal for community solar PV – with sufficient roof area for at least 200 kWp.

If a community FIT is introduced in 2016 and Tesco have still not installed solar PV then it would be a good idea to approach Tesco again. If the commercial FIT is too low to justify a scheme, but a community Fit makes it viable, they may be interested in community ownership and development.

Braunton Cricket Club

The buildings on the cricket club land have an E/W orientation and therefore are not ideal for solar PV. The clubhouse also has low daytime electrical demand. There is insufficient space available for ground mount.

SWW Reservoir, Green Lane

Located on the brow of a hill to the east of the main village this site offered an opportunity for a simple ground mount system. The site benefits from being remote yet still retaining a grid connection.

The front (southern aspect) of the reservoir is angled at around 35^0 (no frame would be required reducing costs) and there are several grid connection options nearby.

The option was ruled out due to the fact that the membrane around the reservoir needs to be replaced every ten years, and means that installation of solar panels on top is impractical.

Figure 52 Green lane SWW site

Figure 52 shows the SWW reservoir at Green Lane with potential location of ground mounted solar PV. There is enough space for 30 kW of solar PV.

Velator Quay Industrial Unit

The small business unit at Velator Quay has south facing roof space. The present roof condition is average.

The building has enough space for 30 kW of roof mounted solar PV.

Due to the current roof condition the building is not a suitable candidate for community solar PV. If the roof is replaced then the business should look seriously at installing solar PV at this point.

Figure 53 Velator quay industrial unit

Aerial photo of Velator Quay business unit – showing potential roof mounted solar PV location.

Perrigo

This large commercial premises on the outskirts of the village has a very large roof space and high daytime electrical demand.

The building uses approx. 7.2 million kWh of electricity per year. The factory is open 24 hours a day from Monday to Friday and for 12 hours a day, during the day, on the weekend.

The roof is a mix of commercial metal flat roof and pitched roof (E/W).

Figure 54 Perrigo roof area

The flat roof is the darker shade in the satellite photo above. The lighter section of roof is two pitches, E/W in orientation. Both sections of roof are in good condition and would support the installation of solar PV.

The flat roof would need to use frame mounted solar PV. This would add cost but would ensure optimal orientation and tilt. The pitched roof is a more standard installation. The E/W split on the roof would help ensure generation early and later in the day. Ideal for a factory that uses power throughout the day with a very high base load.

The roof has enough area for nearly 1MW of roof mounted solar PV. This amount of solar PV would offset nearly 15% of the buildings daytime energy demand. The roof would require a structural survey to ensure that it would support a system of this size.

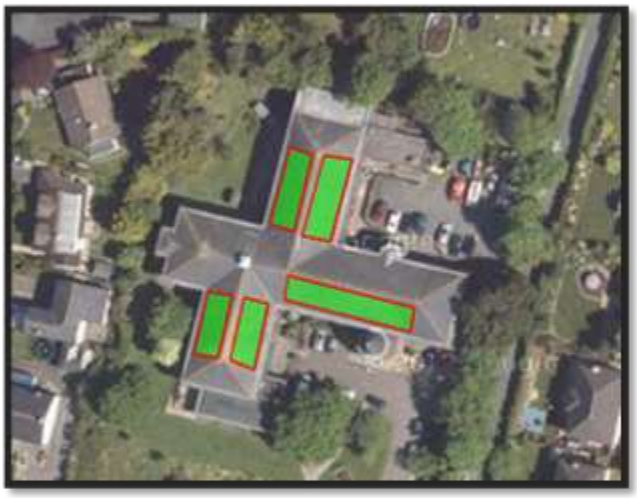
The enquiry in regard to solar PV is with Perrigo management and is being followed up on by the author.

Tyspane Care Home

Care homes have high daytime electrical demand. The building is modern with roof in good condition. The building has a three phase grid connection and with the high demand from lighting and electrical appliances would be an excellent application of roof mounted solar PV.

The building has demand throughout the day. By mounting solar panels on south, east and west facing roof spaces the panels could deliver electricity throughout the day, offsetting electrical demand.

Figure 55 Tyspane care home roof area



Aerial photo showing the potential location of roof mounted solar panels at Tyspane Care Home. The panels facing slightly NW would give generation later in the day, however they are not ideal and may not be required as the other orientations should provide sufficient area for a viable system installation.

Holiday Parks

Although there are none in close proximity to the village, the larger holiday parks in the area are high energy users. For instance Ruda holiday park in Croyde has a large site with significant electrical and heating demand (swimming pool offers excellent potential for renewable heating).
An approach was made to Ruda but no reply was forthcoming.

In the future these holiday parks should certainly be considered again as potential community energy projects due to their high energy demand. This especially the case if a community FIT is introduced by the government.