Best Social and Environmental Practice Guidance for Ray Valley Solar

low carbon hub

CREATING ENERGY WE CAN ALL FEEL GOOD ABOUT

Contents

Foreword

Low Carbon Hub is a social enterprise that's out to prove we can meet our energy needs in a way that's good for people and good for the planet. The days of fossil fuels are numbered, and the shift to renewable generation is gaining pace, giving us the opportunity to reshape the way we manage our energy.

Low Carbon Hub develops community-owned renewable energy in Oxfordshire and re-invests 100% of our own surplus in our mission to create a zero-carbon energy system we can all feel good about.

Ray Valley Solar offers many exciting new opportunities for our mission. Half of our solar energy will need to come from ground mounted PV solar by 2030. If ground mount is an inevitable part of the renewable transition, then at Low Carbon Hub we want to ensure that these installations are designed, delivered, and managed in a way that benefits the local community and environment. We're already learning from the successes of other sites, such as Westmill Solar and Southill Solar, about how we can do ground mount solar in the right way and we want to learn more. Hence, we have commissioned this document, which compiles extensive research and opinion on current best social and environmental practice guidance for developing, constructing, and operating and maintaining a solar park.

This report was written and researched by Gina Moran, University of Leeds, in response to a solar park best practice brief by Low Carbon Hub, as part of a week-long internship in July 2021.

Context

The Solar Trade Association (Solar Trade Association (STA), 2019) consulted with a wide range of experts and stakeholders, in order to create the STA Land Management Charter. The Charter details the following eight commitments as essential requirements for their members, so that they may conduct the best social and environmental practice:

- Meet planning conditions by: achieving or exceeding planning requirements regarding management of the land; managing biodiversity and; ensuring visual screening for the project's entire lifetime
- Support local firms and farmers by subcontracting wherever possible
- Ensure that sites are maintained in a tidy and presentable state by clearing construction and maintenance debris, presenting an aesthetically appealing site to casual visitors, and displaying site contact information clearly
- Demonstrate multi-purpose land use, with frequent and consistent reviews of biodiversity and land management plans
- Encourage consultations and events in order to maximise community engagement
- Ensure that all responsibilities, risks, and health and safety requirements are clear to solar asset owners, farm owners, and operation and maintenance providers
- As part of regular maintenance, monitor and mitigate surface drainage, consulting with relevant bodies, such as the Environment Agency and other local stakeholders
- Consistently consider and work towards ultimate end-of-life decommissioning, avoiding compaction and monitoring soil characteristics

The STA Land Management Charter offers valuable insights into principles which we should bear in mind during the planning, construction, and operation and maintenance (O&M) of Ray Valley Solar.

The following guidance details how to best approach achieving these requirements.

An overview of best social practice

Community engagement and cooperation should be integral to the planning, construction, and O&M phases of a solar park (BRE National Solar Centre, 2015; Jones et al., 2015). The BRE National Solar Centre (2015, p2) emphasise the concept of creating a "genuine dialogue" with the community, as opposed to treating community engagement as a task that needs to be completed. The Eden Project, who have often been praised for their creative approaches to community engagement, suggest that it is important to "value the process as much as the products of engagement" (The Eden Project (no date)). When community engagement is well-planned and well-managed, solar parks can yield immense benefits for the local community and for the solar industry as a whole (BRE National Solar Centre, 2014).

KEY PRINCIPLES

The BRE National Solar Centre (2015) outlines the following key principles which must be maintained when engaging with the community:

- Clear and adhered to timelines
- Maintaining transparency
- Keeping a constructive approach (wherein community engagement aims to work alongside the community, rather than above or against them) and
- Being inclusive, fair and evidence-based

They further emphasise the importance of keeping promises, delivering clear communications, monitoring the impacts of the project, and managing stakeholders' perceptions (BRE National Solar Centre, 2015).

KEY STRATEGIES

There is a multitude of community engagement strategies which have been researched and successfully implemented across the country (BRE National Solar Centre, 2015; Jones et al., 2015). These include:

- Clearly signposted project contact points
- Drop-in events and public forums
- An engaging and informative social media presence
- Local press releases and community newsletters

- Taking a stand at local events, such as fêtes
- Supporting other local projects, especially those supporting renewables, and
- Facilitating and running community activities pre-, during, and post-construction

Regarding the final strategy, many of our fellow green and renewable friends are pioneers in this regard. For instance, The Eden Project facilitate and host creative community engagement events, such as community planning days which are run like local fêtes, film-making workshops with local stakeholders, and practical training days on everything, from gardening to business skills (The Eden Project (no date)). Moreover, Westmill Sustainable Energy Trust (WeSET, 2021a, 2021b) host open days, on-site and virtual tours, as well as eco weeks for the local schools, in order to give back to and engage with their local community.

An overview of best environmental practice

Despite fears that solar farms can have a negative impact on biodiversity and the environment (Roddis et al., 2020; Jones et al., 2015), solar farms have the potential to regenerate land, support wildlife and contribute to national biodiversity targets (BRE National Solar Centre, 2014; Jones et al., 2015; Roddis et al., 2020). Indeed, when effectively designed and managed, solar farms can make exceptional use of the natural capital of the site, enhancing biodiversity, improving carbon storage and climate regulation, and providing the local community with education and leisure opportunities, as well as many other benefits (STA, 2019).

KEY STRATEGIES

It is essential to have a clear Biodiversity Management Plan (BMP) which details specific objectives for biodiversity on the site and how these will be achieved (BRE National Solar Centre, 2014; STA , 2019). There are several approaches to managing and enhancing biodiversity on solar sites (BRE National Solar Centre, 2014, 2015; STA, 2019; Southill Community Energy, 2019), including:

- Maintaining and enhancing hedgerows and field margins
- Sowing wildflower meadows across the site
- Installing artificial habitats, such as bird boxes and bug hotels
- Implementing natural habitats, such as ponds
- Investing in new technologies, such as solar-powered bee hives
- Allowing conservation grazing for periods throughout the year and
- Many other innovative, regenerative approaches

It is important to note that there is no “one-size-fits-all” approach to a BMP, and each BMP must be tailored for a specific site. It is important to employ and work with a specialist ecologist when designing a BMP for the solar site, and during the implementation and maintenance phases (BRE National Solar Centre, 2014; STA, 2019). For instance, Southill Solar enlisted the help of ecologist Dr Guy Parker, one of the UK’s leading ecologists specialising in solar farms, in order to create a “bespoke landscape and ecological management plan” for their solar farm (Southill Community Energy, 2019).

Best Social Practice

Solar farms offer a broad variety of socioeconomic benefits for the local community and beyond. As aforementioned, community engagement should aim to create a "genuine dialogue", as opposed to being treated as a chore that must be completed (BRE National Solar Centre, 2015, p2). Indeed, as the Eden Project, pioneers of creative community engagement, describe sites should "value the process as much as the products of engagement" (The Eden Project (no date)).

POTENTIAL BENEFITS

There are multiple benefits for the local community when a solar farm is built. During construction, there is often an increased demand for local accommodation in B&Bs and hotels, as well as increased patronage of local shops, restaurants and similar businesses. During the construction period and the O&M period, there is the possibility of contracts for plant hire companies, hauliers, electrical, groundwork, drainage and fencing contractors (Jones et al., 2015).

Although in the long-term the development of a solar farm can sometimes result in a fractional reduction in employment, ongoing O&M operations, environmental stewardships and school visit programmes create a small net gain in employment. In rural areas, such as Arncott, solar farms not only offer new employment opportunities, they also mean that local workers have the opportunity to explore work outside of traditional fields (Jones et al., 2015).

Several solar parks offer the possibility of investing in their low-risk, high-yield bond schemes, so that people can invest in their local solar park, and reap the rewards of the positive environmental and social work the solar park is conducting; an example of this was Willersey Solar Farm (BRE National Solar Centre, 2015; Willersey Solar Farm, 2021) although, unfortunately, as a result of the government cancelling the climate change levy exemption for solar panels, the scheme was wound up in November of 2016 (Willersey Solar Farm, 2021).

A solar park which practices well-planned, well-managed, and effective community engagement creates mutually reinforcing benefits for the local community and for the entire industry. The community benefits from the presence of the solar park, in that the solar park offers educational opportunities, invigorates the local economy by patronising local businesses, offering contracts and employment locally, and creates a solar asset that they can be proud of. The solar industry benefits from the goodwill that it creates with the community, as this helps to create a positive image for the industry, making future planning permission applications and similar applications

substantially easier, whilst advancing the progress towards renewables (BRE National Solar Centre, 2015).

WHY UNDERTAKE COMMUNITY ENGAGEMENT?

By engaging with the local community, solar farms not only manifest and reinforce a positive reputation for the industry, they also:

- Reduce opposition, challenge negative perceptions and address concerns
- Identify issues that developers may have missed
- Tap into local knowledge (e.g. which plants grow best where, when are roads quiet, etc)
- Build a support base and foster relationships with the community and
- Meet the expectations of local authorities and councillors

For these reasons, community engagement is a vital aspect of the construction, operation and maintenance of a solar park (BRE National Solar Centre, 2015).

When building a large-scale solar park and conducting community engagement, it is vital to understand and bear in mind the key factors which influence community acceptance of solar (Roddis et al., 2020). The eight overarching categories shaping the community acceptance of solar parks are:

- Aesthetic
- Environmental
- Economic
- Project details
- Temporal
- Social
- Construction
- Process

The figure shown here depicts the above categories and the specific issues within them that most often affect community acceptance of solar parks. Notably, the most commonly articulated concern with solar parks is often the impact of the solar park on wildlife and habitats. This is known as a green-on-green tension, wherein a green innovation, such as a solar park, has a perceived negative impact on another green issue, such as biodiversity. This highlights how important early and consistent community engagement is for dispelling misconceptions about the solar park and its impacts on a variety of categories (Roddis et al., 2020).

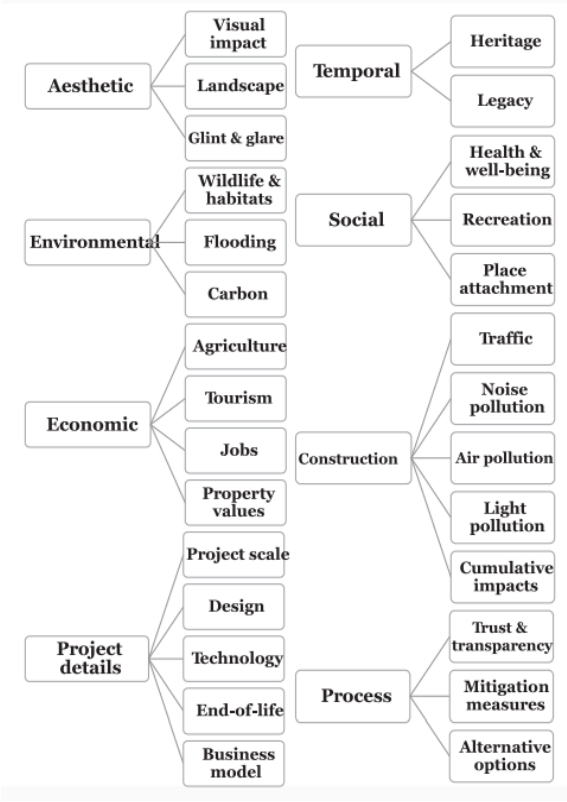

Figure 1 (left): Key categories and sub-categories affecting community acceptance of solar parks (Roddis et al., 2020)

It should also be noted that a recurring issue in community acceptance of large-scale solar is the perception of impacts, as well as the community's knowledge of the impacts. Thus community engagement is vital in informing the community on issues surrounding the project, as well as shaping their perceptions of the project overall (Roddis et al., 2020).

WHO SHOULD COMMUNITY ENGAGEMENT ENGAGE WITH?

Official guidance from the BRE National Solar Centre (2015) suggests that community engagement should aim to reach: neighbours and locals; the nearest settlements; key local leaders; schools and community groups; residents associations and local charities and; other renewable energy developments locally. In the case of Arncott and the wider area, it seems especially crucial to engage with the several schools nearby, the parish council, and the local environmental groups, as well as the local businesses.

Tools for community engagement

Engaging with the local community throughout the lifetime of the site is essential for the project's success. There are a broad variety of tools which have been tested across multiple solar parks and other sustainable sites which have proven to be especially successful in garnering the support of the local community.

EARLY ENGAGEMENT WITH PARISH/COMMUNITY COUNCILS

Engaging with local parish and community councils in the early stages of the project can be hugely beneficial later down the line in the project. When stakeholders in these groups are well-informed, they are much better placed to inform other members of the community about the project. Moreover, it means that the project has an ally within the local council (BRE National Solar Centre, 2015).

PROJECT PHONE LINE/EMAIL

Having a project phone line/email readily accessible for the community ensures that people are able to make contact easily, and that issues are dealt with quickly and remain in-house. A working document or an equivalent should be kept, in order to track the status of any issues, recording when they were logged, and how they were responded to (BRE National Solar Centre, 2015).

DROP-IN EVENTS

Drop-in events are arguably the most widely-used and comprehensive form of community engagement, facilitating an informal and non-

confrontational environment for a genuine two-way dialogue. Drop-in events not only create opportunities to provide the local community with information about the project and address concerns, they also create opportunities to listen and learn from the local community. The local community often have invaluable knowledge about the local area, including issues such as the busiest times for traffic, and the best native plants for the local soils (BRE National Solar Centre, 2015).

When scheduling drop-in events, it is important to choose times that are convenient for locals – this could perhaps be found out by appealing to local social media pages, such as a local Facebook page. It may sometimes be the case that the same meeting should be held twice, in order to ensure that as many people in the community as possible feel heard (BRE National Solar Centre, 2015).

Issuing invitations and publicising the event widely is necessary, although it is often difficult to achieve sufficient attendance. Consulting the key local authorities and relevant local stakeholders can be beneficial in understanding who to invite and how best to reach them. Publicise the event as widely as possible, via local radio, social media, local newspapers, community notice boards, letter drops and other approaches (BRE National Solar Centre, 2015).

When organising and arranging a drop-in event, it can be appropriate to invite key local authority figures and decision-makers to a private viewing and/or site visit beforehand, so that they are best placed to answer questions from the community (BRE National Solar Centre, 2015). It is also important to prepare and set out information packs that people can browse through, as well as project information boards, Q&A sheets, project fact sheets, and perhaps a TV/computer to show videos about the solar industry (BRE National Solar Centre, 2015).

Relevant case studies: **Eden Project**, **St Francis Farm**, **Willersey Solar Farm** and **Wroughton Airfield Solar Farm**


(BRE National Solar Centre, 2015)


(BRE National Solar Centre, 2015)

ADDITIONAL TOOLS FOR COMMUNITY ENGAGEMENT

The below list includes a broader array of tools which are both common and on the more unusual side, as defined by BRE National Solar Centre (2015). The below are the more common tools for engagement, including:

- A project website
- Maintaining a social media presence, e.g. via Facebook
- A comments and feedback mechanism
- A project information pack
- A community newsletter and
- Local press releases

Further options for consideration include:

- Team visits to solar farms in operation
- Hosting one-on-one follow-up meetings for those who expressed concern
- Considering collaborating further with local community groups, businesses, or prospective local contractors
- Commissioning local groups to conduct research on the local history or similar topics
- Facilitating a semi-regular drop-in space where people can easily share their views
- Taking a stand at local events, such as fêtes or exhibitions
- Supporting local public projects on local, renewable energy
- Holding focus groups and workshops, or meeting with local liaison groups
- Implementing social media and public relations

Truly innovative engagement tools include:

- Engaging in the local supply chain and skills development initiatives
- Developing local procurement policies and hosting open days for local suppliers
- Where possible, taking on apprentices from the local community
- Other creative engagement tools, such as those designed by the Eden Project

FOLLOWING UP ON FEEDBACK

It is vital to follow up on feedback from the community and whoever lodges a complaint, as this not only creates trust with individuals and groups who find issues with the project, it also creates learning opportunities which can improve the project. Wherever feasible and appropriate, suggestions to amend a proposal should be adopted, such as specifying construction traffic routes based on local feedback. It can also be beneficial to adopt planting measures suggested by the local community. Importantly, when complaints or queries are

raised, responding to them and providing further information is vital (BRE National Solar Centre, 2015).

Relevant case studies: **St Francis Farm**, **Wroughton Airfield Solar Farm** and **Willersey Solar farm**

CONSTRUCTION

Construction is the most visible phase for a solar park, hence maintaining a good relationship with the local community is vital. Sites could perhaps consider electing a community liaison who can respond to complaints and be the familiar face for the local community. It is also important to maintain previous points of contact, such as social media, email, newsletters, and so forth. Updates should include information such as the expected start and finish dates, activities involved in construction, as well as likely delivery schedules and their routes (BRE National Solar Centre, 2015).

During construction, small gestures can go a long way to continuing to foster goodwill in the community. Sites should create a 'toolbox' of approaches for the best social practice during the construction periods (BRE National Solar Centre, 2015). Tools for this can include:

- Considerate construction techniques
- Road closure notices on roads signs, and in local newspapers/newsletters in advance of the closure
- Construction traffic giving road users right of way wherever possible
- Creating and adhering to a local speed limit for the project
- Arranging road sweepers ahead of time to clear any potential debris
- Creating a traffic management plan which avoids creating traffic at peak times, such as during the school run, or work rush hour traffic
- Staff working on site consistently being polite and friendly with local residents
- Using local supplies and amenities wherever possible

Relevant case studies: **Willersey Solar Farm**

OPERATION

The O&M phase of the project yields even more exciting opportunities for community engagement, as with the loss of the construction crew and equipment, there is the gain of a fully functional solar park, which creates educational opportunities, biodiversity enhancements, a venue for local fêtes and so much more (BRE National Solar Centre, 2015). Some ideas for activities to engage the local community in the O&M phase include:

- Hosting a launch party/official opening event
- Giving guided tours of the site
- Information display boards clearly detailing all of the on- and off- site solar park activities

- Offering site visits
- Hosting art or other competitions for local kids
- Facilitating biodiversity studies and wildlife monitoring
- Supporting research programmes
- Hosting educational activities for local schools, perhaps with environmental rangers
- Making information updates readily accessible and publicising community benefits

CONCLUSION

Good community engagement is essential for a solar park, throughout its entire lifetime. Companies in this field are ultimately ambassadors for the entire industry, so must do their part to ensure that solar PV, which currently has the highest satisfaction and support of any renewable energy, maintains its good reputation (BRE National Solar Centre, 2015).

(BRE National Solar Centre, 2015)

(BRE National Solar Centre, 2015)

Best Environmental Practice

Despite concerns that solar farms create negative outcomes for the local environment and biodiversity (Roddis et al., 2020; Jones et al., 2015), solar farms offer extraordinary opportunities for the local environment and biodiversity. A lack of moving parts means that solar farm infrastructure typically disturbs less than 5% of the ground, with the supporting posts typically taking up less than 1% of the land. Generally, only around 25-40% of the land is over-sailed by the panels and more than 95% of the land can still be accessed for plant growth, wildlife enhancements, conservation growing, and any other biodiversity management strategies (STA, 2019; BRE National Solar Centre, 2014).

Biodiversity gains on solar farms can be significant, however it is crucial to remember that there is no "one-size-fits-all" solution: the best outcome will be achieved by designing in collaboration with the local community, the landowners, local and national conservation organisations, and any other relevant stakeholders. Indeed, biodiversity management strategies and enhancements should be tailored for the site specifically: while the below recommendations are useful, it seems necessary to employ the use of a specialist ecologist for the long-term design, implementation and maintenance of management tools (STA, 2019; BRE National Solar Centre, 2014).

BIODIVERSITY MANAGEMENT PLAN (BMP)

A BMP details the specific objectives for biodiversity on the site and how these objectives will be achieved (such as protecting existing species and habitats, establishing specific enhancements, maintenance and monitoring strategies). The BMP should also cover the plan for decommissioning the site. According to the guidance, a BMP is an integral aspect of a sustainable solar farm (BRE National Solar Centre, 2014). Specifically, the BMP should:

- Identify key biodiversity elements for the site and how to mitigate against any negative impacts from the site's development
- Detail specific objectives for the site's biodiversity and the specific enhancements that will achieve this
- Improve biodiversity, not just on the site, but also in the wider landscape, by improving connectivity between habitats
- Identify species for planting and the best local services for seeds and plants
- Detail potential wider enhancements, such as bird boxes, roosting boxes, ponds, and many other options
- Summarise the management regime for the site for its entire life

- Provide an operationalised plan for monitoring biodiversity

The BMP should be written and planned by a qualified ecologist, and should include recommendations from the Environmental Impact Assessment, habitat and environment surveys, tree surveys and any other ecological surveys, where appropriate (BRE National Solar Centre, 2014). Advice should also be sought from the local community and stakeholders, as the local community typically have a wealth of information on local biodiversity issues and potential best practice (BRE National Solar Centre, 2014, 2015). The BMP should ideally be submitted as part of the planning application and should be presented to the community prior to construction, where possible. The BMP should also be readily accessible to the public, both in terms of readability and clear online or physical accessibility (BRE National Solar Centre, 2014).

Considering using the Solar Park Impacts on Ecosystem Services (SPIES) decision-support tool (DST) in this stage (STA, 2019). Available at www.lancaster.ac.uk/spies (The Spies Project, 2021).

CONSTRUCTION PHASE

Ideally, construction should take account of sensitive times for protected species, such as bird breeding season (March 1st – July 31st). These issues can be detailed in the BMP. It is crucial to ensure the site is kept tidy: excavations should be covered, tools should be locked up, soil compaction should be reduced by minimising vehicle usage wherever possible, and low-pressure vehicles should be used if feasible. Any lighting used during construction should be directional and never at night (BRE National Solar Centre, 2014).

Habitat Enhancement Options

A variety of habitats can be created on solar farm sites, such as hedgerows, field margins, wildflower meadows, nectar-rich areas, winter bird crops, wetlands and many others. Wherever possible, native species that tie in with local and national targets should be planted or enhanced. The little ground disturbance that occurs on solar farms can actually be beneficial for encouraging spontaneous colonisation of the naturally occurring species in the site's seed bank. The options detailed below are predominantly the more typical options for habitat enhancements (BRE National Solar Centre, 2014), however a few are slightly more unusual.

(STA, 2019)

HEDGEROWS

Hedgerows can support a broad variety of wildlife, including plants, invertebrates, birds, reptiles and mammals. In solar farms, existing hedges can be strengthened by filling in any gaps or by planting new hedges as well. Only suitable, native species should be used.

Existing hedges should remain intact where possible and hedges should be protected during construction. If it essential to remove a hedge, this should take place outside the bird breeding season. Any hedge loss should be made up for elsewhere on site.

Maintaining traditional woody hedgerow structures around field margins can have an overwhelmingly positive impact on the abundance of rare species specifically. Hedge maintenance should be carried out in accordance with Natural England Guidance (BRE National Solar Centre, 2014).

Relevant case studies: **Willersey Solar Farm**, **Greencoat Capital**

FIELD MARGINS

Field margins are perfect locations for biodiversity enhancements benefitting plants, invertebrates, ground nesting birds, reptiles and small mammals (BRE National Solar Centre, 2014). Notably, when designed with spatially varied margins, such as scrub grass, wildflower strips and hedgerows, field margins can restore many ecological niches, including butterflies, syrphids, a multitude of invertebrates, and predatory birds (STA, 2019). They should ideally be 7-10 metres wide.

Uncropped tussocky grassland can be established in field margins, providing a variety of benefits depending on the time of year. For instance, whereas during the summer months the grassland will benefit nesting bumblebees and ground nesting birds, during the winter months it will benefit invertebrate habitats. This grassland can usually be left uncut for 2-3 years, allowing tufts to develop (BRE National Solar Centre, 2014).

Knapweed, yarrow, scabious, bird's-foot trefoils and other perennial fine grasses and wildflowers can be sown into the grassland to the benefit of pollen- and nectar-feeding insects (BRE National Solar Centre, 2014).

Relevant case study: **Southill Solar**

SECURITY FENCING

Security fencing at the perimeter of the site not only serves to secure the site, it can also offer an ideal surface for climber plants such as honeysuckle or clematis, which not only provide nectar for various insects, they also double as screening for the site (BRE National Solar Centre, 2014).

When installing the security fencing, it is important to discuss potential options with an ecologist, as some sites could leave a 20-30cm gap at the bottom of the fence, creating a nature corridor, allowing movement of badgers and other wildlife. A native hedge could be planted on the outer side of the fencing, in order to improve security and screening of the site (BRE National Solar Centre, 2014).

Relevant case study: **Greencoat Capital**

WILDFLOWER MEADOWS

Wildflower meadows are species rich, supporting multiple invertebrates, small mammals, reptiles and birds, and other ecological niches. As an incredibly broad spectrum habitat, wildflower meadows vary from fine grasses and a few wildflowers to incredibly complex, species-rich lowland chalk grasslands (BRE National Solar Centre, 2014). Having wildflower meadows can have a direct impact on the yield of several crops, including fruit trees, creating the opportunity for a small orchard on the solar park (STA, 2019; Southill Community Energy, 2019).

Any seed mixes used must be suitable for the soil type, composed of sun and shade tolerant species, and comprised of native species. Previously arable sites may not be suitable for immediate conversion, as the soil is often too high in nutrients to support wildflower sowing. Testing the soil is crucial when attempting to sow wildflower meadows, as meadow establishment is rarely successful on soil with a Phosphate index greater than 1, hence an experienced ecologist should advise (BRE National Solar Centre, 2014).

Wildflower meadows can be sown beneath the array or in strips at the edge of the site, although it is important to note that wildflowers sown beneath the array should be pruned regularly (BRE National Solar Centre, 2014).

Establishing the meadow can take time and following good practice is crucial for success, however once established the meadows are typically quite stable. General maintenance guidance suggests that a haycut in July/August, with grazing from August to Christmas is the best practice, with little to no grazing in the summer months. A maintenance plan should be included in the BMP (BRE National Solar Centre, 2014).

Relevant case studies: **Chelworth Solar Farm**, **Solarcentury and Bumblebee Conservation Trust**, **Southill Solar**, **Next Energy's Berwick Site**, and **Willersey Solar Farm**

PASTURE

Pasture can be established under the solar array or around site margins, primarily for the purpose of livestock grazing. Adding blends of fine grasses can add benefits for wildlife. Moreover, adding native wildflower species to the pasture can also help to ensure that nectar is available over a longer time period: in this case, native species such as the red clover are especially good for bumblebees (BRE National Solar Centre, 2014).

Pastures are typically less expensive to establish than other options, however it does require re-sowing at 3-4 year intervals, with regular agricultural inputs. Pastures are also lower in biodiversity value than other options (BRE National Solar Centre, 2014).

POLLEN AND NECTAR STRIPS

Pollen and nectar strips provide food for pollinating insects in the summer months. Seed mixes are usually inexpensive, as they typically contain common species such as sainfoin, bird's foot trefoil, and red clover (pictured below). These can be sown in strips within the farm itself or in field margins, and should be re-sown every 3-4 years (BRE National Solar Centre, 2014).

Relevant case study: **Greencoat Capital**

(Eden Renewables, 2018)

WILD BIRD FEED MIXES

Strips of wild bird feed crop mixes can be established to provide food for wild birds. These crops usually contain a mix of cereal and oil-rich crops, such as quinoa or oilseed rape. The crop mixes are sown in spring and subsequently re-sown annually, and are left standing so that the birds have access to the seed crop for the winter. The mixes are usually grown in strips, so are ideal for site boundaries and field margins (BRE National Solar Centre, 2014). Parts of the Southill Solar site have been seeded with wild bird feed mixes, to help resident linnets and yellowhammers, as well as the total 48 different bird species identified on site (Southill Community Energy, 2019).

Relevant case study: **Southill Solar**

BARE UNCULTIVATED STRIPS

In some cases, some strips may be left bare for maintenance or propagation of rare arable plants, where appropriate (BRE National Solar Centre, 2014).

WOODLAND HABITAT

Although a woodland habitat is certainly unsuitable for placement in the middle of the solar array, it can potentially serve as screening on the Northern boundary of the site, or in other areas of the park. It is important to plant and sow native species, as these will help other native flora and fauna to flourish. Guidance suggests planting in open glade and ride patterns in order to achieve a variety of structures (BRE National Solar Centre, 2014).

PONDS AND WATER COURSES

Ponds and water courses can be extremely beneficial to invertebrates, amphibians, birds and reptiles, as long as a high water quality is maintained. Any new water habitats should be created in areas of low wildlife value, hence the presence of an experienced ecologist is essential to establish which, if any, areas on site are appropriate (BRE National Solar Centre, 2014).

Ditches will attract the most wildlife, as long as a variety of conditions are provided, such as shady and sunlit areas, shallow and deep sections. All kinds of water features will benefit from a wide uncropped grassland buffer (BRE National Solar Centre, 2014).

Relevant case studies: **Foresight Group**, **Willersey Solar Farm**, **Next Energy's Berwick Site**

WETLANDS AND DRAINAGE

Managing wetlands and land drainage on solar sites is crucial for maintaining best practice. Well-managed land drainage systems help to protect electrical components and promote healthy vegetation at ground-level (STA, 2019).

Drainage management, when effectively considered and catered for at the planning stage, creates opportunities for establishing endangered wetland and artificial fens habitats. Implementing open drainage structures, such as ditches, swales, and balancing ponds, as opposed to sub-drainage structures, create rich ecological niches, for many water-dependent invertebrates and amphibians. Open drainage systems have been found to contribute to significantly higher levels of biodiversity (STA, 2019).

Constructed wetlands have also been effective in managing chemical run-off, especially on sites which have been used for agricultural purposes. Planting reedbeds in field margins can also be used as a natural filtration system (STA, 2019).

Relevant case study: **Foresight Group**

ARTIFICIAL HABITATS FOR INVERTEBRATES

Artificial habitats for invertebrates offer habitats for a wide array of invertebrates, reptiles, amphibians, lichens and fungi.

Log piles are an excellent example of artificial invertebrate habitats and are easy to construct: hard and soft wood is stacked in a pile and simply left to rot down. Log piles can be placed in both sunny and shady spots. (BRE National Solar Centre, 2014).

ROOSTING AND NESTING STRUCTURES

Birds, bats and small mammals can benefit from a wide variety of artificial roosting and nesting hibernacula and structures. An experienced ecologist should be consulted in order to maximise the effectiveness of the structures' construction and placement (BRE National Solar Centre, 2014).

Although roosting and nesting structures would generally be placed in and around hedgerows surrounding the site, there has been some success in installing these structures within the arrays by affixing planks to the solar frames, and other similar methods (BRE National Solar Centre, 2014).

Another potential structure which not only yields benefit for the local wildlife but also for the local community is the bug hotel. Bug hotels yield benefits for solitary bees, wasps and stag beetles, as well as many other invertebrates (BRE National Solar Centre, 2014). They also offer educational opportunities for local schools: for instance, Next Energy's Berwick Solar farm hosted an educational school visit, which involved the school children

constructing a bug hotel and learning about how this benefits the local biodiversity (STA, 2019).

An increasingly popular habitat structure for solar farms is beehives. Multiple solar farms now either offer their land to local beekeepers as a site to place their hives, or they invest in a resident beekeeper and buy bees for the site specifically. This not only invigorates the local biodiversity, it also creates good will with the local community (BRE National Solar Centre, 2014; STA, 2019). An especially exciting new development in this area is the introduction of solar-powered beehives on solar sites, a project by the Naturesave Trust, which managed the Solar Bee Project (Community Energy England, 2019). These thermosolar beehives use solar energy to kill the varroa mite which has devastated bee populations around the planet. These hives have been installed at Cuckmere Community Solar, Ernesettle Community Solar, Chelworth Solar, and Chelwood Solar (Community Energy England, 2019).

Relevant case studies: **Next Energy's Berwick site**, **Low Carbon**, **Greencoat Capital, Willersey Solar Farm**, **Chelworth Solar**

It should be noted that many other options exist, such as creating scrub, health, wetlands and coppice, hence it is vital to employ an experienced ecologist and discuss all of the options with them (BRE National Solar Centre, 2014).

MANAGING SITE BIODIVERSITY

Well-planned and appropriate management on site is crucial for the BMP and for maintaining a high level of biodiversity. Without appropriate management of habitat enhancements, the benefits that enhancement offers can be lost; for instance, if a wildflower meadow is seeded, but subsequently over-mown or over-grazed, many of the flowers can die out. In this case, when mowing and grazing management of a wildflower meadow is appropriate, wildflowers from the seed bank may spontaneously colonise (BRE National Solar Centre, 2014).

Managing biodiversity is less intensive, and therefore cheaper, than agricultural land management. This is because habitat enhancements for biodiversity tend to benefit from little disturbance and intervention, once well-established (BRE National Solar Centre, 2014).

Sites with little to no pesticide or fertiliser usage hold a lot of potential for biodiversity, as this therefore requires little management intervention, and allows nature to take its course and flourish (BRE National Solar Centre, 2014).

The BMP should be clear on management activities and their methodology, timing and frequency (such as mowing grasslands, what time of

year, and how many times throughout the year). The site management team and any contractors should be well informed of the biodiversity objectives for the site (BRE National Solar Centre, 2014).

GRAZING

Low intensity grazing produces multiple benefits when managing grasslands: it is a low cost management technique; it increases the conservation value of the site and; keeps the land agriculturally productive (BRE National Solar Centre, 2014). Notably, grasslands managed with grazing generally have a higher carbon sequestration potential than grasslands which are mown; in fact, stopping mowing entirely has a direct correlation with an increased species richness and abundance (STA, 2019).

Sheep are typically the most suitable grazers, as they are small, readily available and easy to handle. Horses and cattle have a tendency to damage the arrays. If grazing is conducted with enhancing biodiversity in mind, then maintaining a low stocking density (i.e. a small number of sheep) is the best practice (BRE National Solar Centre, 2014).

Grazing should be stopped for periods in the spring/summer, depending on the biodiversity objectives for the site. Stopping grazing in the springtime (April-June) favours early flowering plants, whereas stopping grazing in the summertime (July-September) favours summer flowering herbs. Stopping grazing during the April-September months and maintaining a low stocking density yields the greatest biodiversity benefits, although depending on the farmers' schedules this may not always be possible (BRE National Solar Centre, 2014). Stopping grazing in these months also helps to create fodder for pollinators (STA, 2019).

If the grasslands on site are being managed for the protection and enhancement of ground-nesting birds, some light grazing is acceptable. In this case, however, the grassland should not be mown or even topped during the summer months (BRE National Solar Centre, 2014) as this helps to ensure that ground-nesting birds can reproduce safely (STA, 2019).

Relevant case studies: **Chelworth Solar**, **Southill Solar** and **Next Energy's Berwick Site**

MONITORING BIODIVERSITY

Monitoring biodiversity on site is crucial for best environmental practice. Sites should: identify key biodiversity indicators; establish baseline conditions and; assess changes to biodiversity throughout the project's life. The BMP should establish how biodiversity will be monitored, what methods will be used, how frequently biodiversity will be monitored, and when throughout the year it will be monitored (BRE National Solar Centre, 2014).

If protected species are found on site, they must be surveyed annually, as a minimum. Wildflower meadows, similarly, should be closely monitored to ensure that they reach their full potential. Any enhancements should be checked regularly, according to type of enhancement. For instance, health of plantings should be assessed in spring and autumn, whereas nesting boxes should be cleaned and their structural integrity checked, outside of the breeding season. Any feedback in this regard should go directly to the management of the site, with guidance from the expert ecologist. Having a full-time professional ecologist can be costly, however it is the site's responsibility to the local and wider environment, to the local community, and to the entire industry to monitor biodiversity carefully. Moreover, a professional ecologist is unnecessary for every monitoring task – an amateur naturalist, for instance, can be employed for some monitoring, such as identifying bird species (BRE National Solar Centre, 2014).

Sites could also consider the possibility of inviting members of the local and national conservation community to periodically audit the site's monitoring and management of biodiversity, as well as the progress the site has made in achieving the objectives set out in the BMP (BRE National Solar Centre, 2014).

The table included below from BRE National Solar Centre (2014) is useful for depicting a summary of how to best approach outlining habitat enhancements and their respective monitoring activities.

Biodiversity element	Monitoring activity	Key indicators	Target	Frequency	Time of year
Hedgerows	Walk full length of hedgerows	Check for browse damage, dead whips, weeds, gaps	Species mix and density of original planting is maintained	Annually	Summer
Woodland	Inspect all new plantings	Check for browse damage, dead whips, weeds	Species mix and density of original planting is maintained	Annually	Summer
Wild flower meadow	Walk full length of grassland habitat	Count herbs flowering – check against seed mix species list Check for injurious weeds in high density	ID indicator species for year 1 Species richness should approach seed mix by year 5	3 times during first year of establishment, then annually	3 times between March and July in 1st year, then July
Nest boxes	Inspect each box	Check boxes are intact, secured, previously used for nesting, clean	25-50% of boxes occupied by target species in year 2	Annually	Winter
Birds	Walk-through of entire site plus point surveys in early morning	Record all birds, especially arable priority species. Check against target bird species list in BMP	Bird species increase by year 5	Annually; repeat 2-3 times per session	Summer (March – August).
Reptiles	Check reptile suntraps	Record all species	Reptile species maintained or increased by year 5	Annually; repeat 2-3 times per session	Summer

Case studies

CHELWORTH SOLAR:

Developed by Wiltshire Wildlife Trust

Chelworth Solar, Wiltshire Wildlife Community Energy's first PV installation, is a 1MW ground mounted array, creating enough electricity to power 450+ homes. It is adjacent to Wiltshire Wildlife Trust's Blakehill Nature reserve, and biodiversity is at the heart of its mission (WWCE, 2019).

The site was a brownfield site (BRE National Solar Centre, 2014), and is home to the endangered Great Crested Newt. A pond was dug during the installation period to help increase its abundance. Moreover, the on-site grassland is being restored to a wildflower meadow "helping to replace some of the 97% of hay meadows that have been lost since the 1930s" (WWCE, 2019). The planting will be a mix of sun-loving and shade-tolerant species, to reflect the natural environment created by the solar array (BRE National Solar Centre, 2014).

It is their long-term intention that sheep owned by the Wiltshire Wildlife Trust will be allowed to graze the land too (BRE National Solar Centre, 2014).

A broad variety of biodiverse species have been spotted on site, including many butterflies, damsel flies, bees, rabbits and roe deer (WWCE, 2019).

Chelworth Solar is also a part of the Solar Bee Project, pioneered by Naturesave, which uses thermosolar beehives to naturally kill the varroa mite (Community Energy England, 2019).

(BRE National Solar Centre, 2014)

(BRE National Solar Centre, 2014)

(WWCE, 2019)

(WWCE, 2019)

THE EDEN PROJECT:

Creative community engagement

The Eden Project have pioneered creative community engagement activities, suggesting that we should "value the process as much as the products of engagement". They have pioneered creative community engagement activities, such as: drop-in community planning days, designed like local fêtes; film-making workshops with local stakeholders and; practical training on everything from gardening to business skills (The Eden Project (no date)).

The Eden Project comment that their community engagement activities have four key objectives. First, to establish a real sense of participation: they aim to offer tangible ways to give input, such as in 'washing lines' at events for people to attach comments to. Secondly, they aim to encourage new people to get involved, by reaching broad demographics in an accessible, convivial setting. Thirdly, they intend to inspire new thinking: the Eden Project offers inspirational spaces with practical activities. Finally, they aim to catalyse partnerships with the community and beyond, creating long-lasting community engagement projects in the local community. An example of this is their work to design and realise nature-based play spaces in the Cornish community (The Eden Project (no date)).

FORESIGHT GROUP:

Managing wetlands and land drainage

Foresight Group aim to use natural solutions to turn solar parks they own, manage or have acquired into thriving biodiverse habitats, whilst also improving the site's safety and energy productivity. If sites are going to be flourishing hubs of biodiversity with plenty of flora and fauna, as well as being safe and functional, it is vital that the site is managed effectively so that the equipment is not exposed to excessive amounts of water (STA, 2019).

With the right amount of consideration at the planning stage, drainage systems can be economically installed and be inspired by nature, taking cues from biomimicry. Drainage systems can be combined with biodiversity enhancements, by utilising ditches, swales and balancing ponds to create aquatic habitats. Balancing ponds are both an effective drainage management solution and a provider of diverse habitats, as they fill during high rainfalls and recede during dry weather periods (STA, 2019).

Management is especially important in the case of water, as poorly managed drainage ditches can quickly become unmanageable, becoming overgrown with brambles and hedge plants, and logged with deadwood that prevents adequate drainage of the site (STA, 2019).

GREENCOAT CAPITAL:

Protecting and enhancing habitats

Greencoat capital aims to protect and enhance the value of the natural capital of the solar sites under its stewardship. Promoting biodiversity is an integral part of their approach (STA, 2019).

Greencoat Capital focus especially on planting and sowing a range of native flora, supporting a variety of microhabitats and ecological niches. This creates a high level of biodiversity on the site, encouraging natural colonisation (STA, 2019).

The company also understand the importance of hedgerows to the UK's net biodiversity and aim to help strengthen the connectivity of these boundary habitats by engaging in supplementary planting. Much as The Solar Trade Association describe:

"At Greencoat's Westover site, new native hedgerows were created around the perimeter with a mix of species including field maple, hawthorn, common hazel, holly, blackthorn, wayfaring tree, honeysuckle, and dog rose. Greencoat has implemented a comparable programme at its Grange Farm site, where they have established new hedgerows with a native species mix consisting of over 2000 species." (STA, 2019, p28).

Greencoat prescriptively plant new trees every 8m alongside existing hedgerow margins, with the addition of a new understory of shrub, thereby enhancing the value of the habitat for the local wildlife, by increasing the density of tree cover (STA, 2019).

By sowing nectar and pollen rich mixes, Greencoat further enhances strips of land outside the perimeter of the solar farm , attracting a variety of fauna, including invertebrates, a variety of butterflies, various birds, and small mammals. 12 species of butterflies have been identified at Greencoat's Sellindge site, including small heath and hairstreak butterflies (STA, 2019).

Regarding the implementation of artificial habitats, Greencoat take the stance that these should be implemented, in order to ensure there is a habitat for local wildlife. They have implemented badger gates within their security fences at their Hoplass site, accommodating for the nearby badger setts. They have also implemented bird and bat boxes, which has led to many red- and amber-listed birds such as kestrels, meadow pipits and redwings taking residence at the site (STA, 2019).

By supporting scientific research, such as the work of the University of Worcester examining the effect of solar panels on the local ecosystems below them, Greencoat Capital and its partners also help to create a positive reputation for the solar industry. Further, Greencoat Capital host educational visits for the local community and the local schools, showing positive degrees of community engagement (STA, 2019).

LOW CARBON'S SOLAR POWERED HONEY:

Low Carbon have beehives on solar parks all across the UK and with approximately 60,000 bees per hive, over two million bees call their solar parks home. As a standard, the hives are attended regularly by beekeepers, ensuring that the bees' health is at an optimum level; with the increasing risk of climate change, this task becomes especially arduous, as this is leading to an increase in mites and parasites (Low Carbon, 2021).

The honey is harvested and bottled from the hives every year, leaving sufficient amounts for the bees to survive on through the winter. The honey is spun, lightly filtered and then placed in settling tanks. This process warms the honey slightly before it is jarred. The honey is never irradiated or pasteurised (Low Carbon, 2021). Low Carbon Hub gift their honey to key stakeholders, "to highlight the belief that the enhancement of biodiversity should be a core responsibility for renewable energy companies" (STA, 2019, p27).

Low Carbon are pushing the boundaries of protecting the health of their bee colonies: they are experimenting with methods which would connect the hives to the web, enabling them to monitor factors such as brood temperature, humidity, hive mass, and external weather conditions from afar (STA, 2019).

(STA, 2019)

(STA, 2019)

(STA, 2019)

NEXT ENERGY'S BERWICK SITE:

Next Energy Capital have championed measures which add maximum value to the biodiversity net gain of solar parks, without compromising site operations, based on strategies developed on its portfolio of 80 solar sites (STA, 2019).

Its Berwick site is, in many ways, in a compromised position: it is located next to a Site of Special Scientific Interest and a local Nature Reserve, the 100-hectar Arlington Reservoir, hence biodiversity and environmental best practice has taken centre stage in its mission. The solar park was constructed so that two large ponds and the mature hedgerows on site could be maintained. It also developed a 0.5Ha area specifically for community use; Cuckmere Community Solar are already establishing an orchard there (STA, 2019).

Next Energy Capital design a two-phase action plan, each of which is site-specific, ensuring that any enhancements made are tailored specifically for the factors affecting any specific site. In the case of their Berwick site, the first phase of the action plan have been enacted as follows:

- Native wildflowers have been sown into soil heaps around the site
- With the help of the local school, bug hotels were constructed, helping invertebrates to breed over the winter
- Local apple varieties were planted in collaboration with multiple organisations
- Conservation sheep grazing occurs from autumn to spring

Next Energy have planned their second phase for their Berwick site, which includes: creating a kingfisher nesting area near one of their ponds; placing educational sign boards around the site, which detail local biodiversity and wildlife facts for visitors; introducing thermal beehives; placing hedgehog houses around the site; enhancing the community orchard by planting soft fruit and herbs and; hosting further school trips for over 200 students (STA, 2019).

A bug hotel constructed as part of an education school visit to Berwick solar farm (STA, 2019).

PARK FARM:

Developed by Solstice Renewables

Park Farm is a 12.9MWp solar farm in Leicestershire working with the three local primary schools to teach them about biodiversity, energy efficiency, and the importance of renewables in tackling climate change (BRE National Solar Centre, 2015).

Solstice Renewables funded educational initiatives for the local schools in the areas where they managed solar parks, for the full lifetime of their projects (25 years!). Resources for school visits were designed with the national curriculum in mind, aiming to support learning from Foundation level to year 8, with the hope that children would aspire to careers in science. Children were taken on guided bug hunts, so that they could gain hands on experience in the ecology field, learning about biodiversity and what solar parks can do to enhance it (BRE National Solar Centre, 2015).

Park Farm received glowing feedback from the local schools, with one headteacher commenting that it was a "fantastic opportunity for the children… to discuss possible future renewable energy solutions and to be able to relate these to their own schools and local community" (BRE National Solar Centre, 2015, p13). It should be noted that Belltown Power have taken over Solstice Renewables' management of Park Farm solar.

SOLARCENTURY:

In partnership with Bumblebee Conservation Trust

In the past century, bumblebee populations have drastically decreased, with two UK species becoming completely extinct. Hence, the partnership between Solarcentury and the Bumblebee Conservation Trust seeks to support and promote bumblebee friendly environments in and around Solarcentury's biodiverse solar farms (BRE National Solar Centre, 2014).

Solarcentury sow acres of native seed mixes in order to create acres of wildflower meadows, which will appeal to a wide array of ecological niches. The farms themselves are also entirely fenced off, ensuring the creation of a safe haven for the local flora and fauna (BRE National Solar Centre, 2014).

It is the intention of Solarcentury and the Bumblebee Conservation Trust to engage with the local communities in the vicinity of their solar parks to demonstrate how people can plant bee-friendly plant species in their gardens and public green spaces in order to support and protect bees. The hope is that this will manifest a 'positive green loop' between solar parks and local green spaces, further encouraging the establishment of healthy bee populations across the UK; it is especially hoped that this will include populations of rarer bee species (BRE National Solar Centre, 2014).

SOUTHILL SOLAR:

Southill solar is a 4.5MWp solar farm located alongside the railway line between Charlbury and Fawler. The site operates within an Area of Outstanding Natural Beauty in the Cotswold countryside, so it was crucial for the site to "create an environment that enhances biodiversity – doing good for local plants and wildlife (Southill Community Energy, 2019).

Southill Solar have worked with Dr Guy Parker, the UK's leading ecologist specialising in solar farms. Dr Parker designs a bespoke BMP for the site, ensuring that wildflowers, bees and butterflies, as well as many other flora and fauna can flourish on the land. Indeed, Southill Solar are "taking a piece of fairly average agricultural land and turning it into something highly productive" (Southill Community Energy, 2019).

Southill have implemented multiple strategies to enhance biodiversity on site (Southill Community Energy, 2019). These include:

- Filling gaps in the hedgerows with a variety of shrubs, providing food and habitat for farmland birds and enhancing the hedgerows
- Developing wide field margins of tussocky grass bordering the entire site, providing food and habitat for hares, reptiles, and nesting bumblebees
- Sowing a wildflower meadow into the site grassland, providing a home for rare chalk-loving plans, as well as a plethora of insects birds and mammals
- Establishing a traditional grazing mix of fine grasses and wildflowers beneath the arrays, allowing sheep to graze so that the panels don't become overgrown. The sheep will be removed during the summer months to ensure that the wildflowers bloom and set seed
- Planting an orchard of 60 fruit trees, including apple, pear and nut, providing fruit for the local community and the local wildlife
- Seeding part of the site with a wild bird seed mix, to help resident linnets and yellowhammers, as well as the six pairs of skylarks and 48 bird species identified by the site's bird expert
- Placing Naturesave's thermosolar beehives on site and producing their own honey

(Southill Community Energy, 2019)

SOUTHWICK SOLAR FARM:

By Primrose Solar

In collaboration with Solarcentury, Southwick Solar Farm set new environmental construction standards for the solar industry, implementing measures such as composting toilets, solar-powered and biodiesel generators, and a carpool scheme for construction staff (BRE National Solar Centre, 2015).

Neighbours received regular updates throughout construction, especially regarding issues which they had logged. Traffic monitors ensured that local traffic took priority, the carpooling system helped to reduce traffic, and potholes were filled as fast as possible (BRE National Solar Centre, 2015).

The local economy saw multiple benefits as a result of construction: parking and storage areas were rented from neighbours; staff stayed in local hotels and B&Bs; construction staff were catered to with locally-sourced food and; local contractors provided reinstatement works (BRE National Solar Centre, 2015).

Now that the site is operational, the site employs local business for any ongoing maintenance issues and tasks. The site has also hosted regular educational talks, guided tours, and open days for local schools and businesses. Once landscaping had been completed, local beekeepers were also invited to keep beehives on the site (BRE National Solar Centre, 2015).

ST FRANCIS FARM:

By Lightsource

St Francis Farm, a 4.33MWp solar farm developed and operated by Lightsource, is an excellent example of why community engagement is so vital for project success (BRE National Solar Centre, 2015).

At first glance, the site seemed perfect for a solar site: it was well-screened by mature boundary vegetation, on lower grade land, and had close proximity to a potential grid connection. However, the drop-in information evening saw 83% of the feedback forms returned as unsupportive of the proposal. It was identified that the current landowner unofficially allowed riders from the neighbouring livery to use the fields the solar farm would be constructed on for riding. The principal concern was that the construction of a solar farm would prevent this and negatively impact the livery (BRE National Solar Centre, 2015).

Through constructive community engagement and close work with the livery operator, Lightsource were able to come to a suitable conclusion: a new all-weather riding track would be supplied around the outside of the solar farm and one of the three fields included in the proposal would be removed from it. A subsequent drop-in event saw immense support for the solar farm, with just 10% of respondents still against the project (BRE National Solar Centre, 2015).

WESTMILL SOLAR FARM:

The Westmill Solar Co-Operative generates enough energy to power 1,400 homes a year, preventing 2000 tonnes of CO_2 emissions annually (WESET, 2021b). Westmill Solar Farm have an exciting and engaging O&M community engagement strategy, hosting open days, tours and virtual tours, and an eco-week for the local primary schools (WESET, 2021a).

During eco-week, students are invited to take part in a week of 10 inspiring sessions (WESET, 2021a). Some of the past examples include:

- Building an Ecoden with the students, starting from a simple stick and piece of string, and ultimately putting a roof on it
- Drawing a settlement to demonstrate how many houses the entire Westmill site could power
- Decorating cotton snackbags with symbols for the different renewable energy sources

The Westmill Sustainable Energy Trust always use a team of their own guides and employ some local artists. Every eco-week, the team:

- Give a tour of the solar park and demonstrate how the sun can produce electricity by using a solar powered electric train and solar powered plastic bugs as examples
- Invite the children to examine the flora and fauna on the site, and discuss these further
- Explain how much power the site generates and how this contrasts with other ways of producing energy, such as comparisons of scale and environmental impact
- Work with STEM ambassadors who can explain more technical topics and details whilst still making them accessible to the children, such as the engineering of the site, the specialist materials used and so forth

Westmill Sustainable Energy Trust hopes that these eco-weeks will show the students what kinds of exciting careers are available to them in this field (WESET, 2021a).


(WESET, 2021a)


(WESET, 2021a)


(WESET, 2021a)

WILLERSEY SOLAR FARM:

By BELECTRIC UK and Big60Million

Willersey Solar Farm, a 3.8MWp solar farm in Gloucestershire, initially faced strong opposition in the consultation phase, receiving so much negative coverage that it reached the national press. This led to BELECTRIC setting up a community benefit energy company, Big60Million, which shared the financial, environmental and social benefits with the locals (BRE National Solar Centre, 2015).

The site also developed a BMP which included hedgerow and wildflower planting, installing beehives, digging a pond, installing bird and mammal boxes, constructing a hibernaculum constructed from stones, and planting vegetation to shelter reptiles, amphibians and insect life. Local schools were also involved in multiple biodiversity enhancement projects, such as seed planting and building bird boxes (BRE National Solar Centre, 2015).

As a result of these investments in the local community and the local environment, public opinion drastically shifted to favour the project (BRE National Solar Centre, 2015).

WROUGHTON AIRFIELD SOLAR FARM:

By Public Power Solutions

The Wroughton Airfield Solar Farm, a 41MWp solar farm developed by Public Power Solutions located in Wiltshire, sits on a former WWII airfield site. The site itself is within the Northern edge of the North Wessex Downs Area of Natural Beauty and lies at the foot of Barbury Castle: an incredibly challenging place to build a solar park. Therefore, the developers made clear to the public, on live BBC news, that if the public didn't want a solar park there, it wouldn't be built (BRE National Solar Centre, 2015).

Public Power Solutions conducted a widespread community engagement campaign, using TV slots, radio interviews, and newspaper articles, even hand-delivering over 8,000 invitations to the public consultation event. Over 600 residents attended the consultation, with 80% strongly supporting the project (BRE National Solar Centre, 2015).

After months of planning, the developers incorporated local residents' suggestions into the project plans, however the issue eventually went to Public Inquiry. Further consultation led to 90% of the public supporting the project, and eventually the site was granted the application. The planning inspector specifically cited the enormity of public support as a key factor influencing their decision (BRE National Solar Centre, 2015).

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