BRIGHTON ENERGY COOPERATIVE

Solar PV & EV Charging

Funded by the Power to Change Next Generation Community Energy Programme.

NEXT GENERATION

COMMUNITY ENERGY EVOLUTION

power to change

COMMUNITY FUND

Contents

Glossary & Abbreviations

The following terms and abbreviations are used throughout this document

Term	Abbreviation	Definition
Brighton Energy Co-operative	BEC	
Battery Electric Vehicle	BEV	Battery Electric vehicles use batteries only to power an electric motor. BEVs can be charged from a electrical socket, or EV charge point.
Electric Vehicle	EV	Collective term for all electric vehicles whether fully battery powered (BEV), Plug-in hybrid (PHEV) or hybrid.
Electric Vehicle charge point	EV CP	A
Hybrid Electric Vehicle	Hybrid	A petrol car with a small battery with very limited range. The battery is charged through regenerative braking or from the petrol engine
Internal combustion engine	ICE	Traditional petrol or diesel engine
Local Authority	LA	Collective noun for local public government body. Could be county, district, London borough.
Plug-in hybrid electric vehicles	PHEV	PHEVs use batteries to power an electric motor and another fuel, such as petrol, to power an internal combustion engine (ICE). PHEV batteries can be charged using a wall socket or charging equipment, by the ICE, or through regenerative braking.

Executive Summary

Brighton Energy Cooperative (BEC) is a community energy business based in Brighton on the South Coast. We were founded in summer 2010 and since then we have raised £3.4M, installed 80 solar arrays with 3.5MW of PV and have over 700 members who are also our investors. Our purpose is to make a positive community impact and developing social, environmental and economic resilience locally. The ending of the Feed in Tariff has however made the business case for community owned solar PV much more marginal and therefore we are looking at alternative sources of revenue generation, including EV charging.

The UK government has announced a ban on sales of new petrol & diesel cars which will be implemented in 2030 & the same for hybrid cars in 2035. Investment in EV charging infrastructure is critical to enable the transition to electric vehicles, reducing the users' anxiety around charger availability to enable them to complete their journey. There are now c200 models of EV available, more *en route* from the majority of major car manufacturers. There is considerable investment in charging infrastructure, from individual homeowners, networks of lamp-post charge points by local authorities to new electric forecourts, but this is not yet at a level to enable mass adoption of EVs.

Community energy groups across the country are potentially well positioned to contribute to local transport electrification with renewables, EV charging & batteries. Also, community ownership can potentially make charge points viable in locations without public transport and overlooked by national charge point providers. It is therefore the right time to determine if EV charging by community groups can plug the financial gap left by the discontinuation of the solar PV Feed in Tariff Government subsidy.

Through the Next Generation project, Brighton Energy sought to identify the circumstances in which EV charging revenue can contribute to making community renewables viable again and thereby potentially support the next phase of community energy growth and thus enable local benefit delivery. Our experience has shown that, currently, the commercial case for siting EV chargers alongside community owned renewables is marginal and very location dependent. There are several factors that are critical in ensuring that revenues earned from EV charging are sufficient to provide a return on investment and supplement the earnings from community owned renewables. But the forecast growth in EVs in the next few years is anticipated to tip the balance into a more secure business case for EV chargers to sit alongside community owned renewables. Within this report we highlight extensive learnings that can set other community energy groups on the path to financially sustainable business models for co-located EV charge points and solar PV.

Our top tips:

1. Take time to identify suitable sites whilst EV ownership is relatively low in the general population. Minimising hidden costs and maximising utilisation rate of the chargers are key to profitability. Think in terms of the '4Ps' of place, price, product & promotion.
2. Nearby free to use charge points are a definite risk for the community owned business model.
3. A site with a large volume of users and high turnover of charging gives both volume and utilisation rate for the charger.
4. Working with large organisations brings legal and procurement overheads. Be prepared for delays and tougher contract negotiations. Also where possible reduce costs by getting the landlord to insure the EVCP.
5. Compare charging technology carefully. Don't forget to ask about support software and customer service as well as the hardware. Tender if buying in volume.
6. Use charging technology or additional technology that can identify the source of the electricity (renewable or grid) where possible. The cost of the electricity used to charge has a big influence on financial viability of the business model.
7. Get quotes from local EV installers, their costs can be lower than quoted by the charge point provider.
8. Charge points are not install and forget, as there are on-going admin & billing overheads to consider.
9. The location of the charge point is important, ideally choose parking bays close to an electrical distribution board and that don't require a costly 'hard dig' of tarmac of concrete.
10. The existing electrical load on a site needs to be considered before a charge point can be installed

Section 1: Reflection on original business plan and objectives

Project overview

In 2019 Brighton Energy Co-op (BEC) was awarded £100K from Power to Change (through the Next Generation programme) to carry out live, in-market trials to determine what is a profitable 'package' of PV, EV charging, batteries*, location, price and customer demand. This could then be developed by both BEC and other community energy groups as a viable on-going business proposition.

Vision

Create an economically viable combination of PV, EV charging and batteries* that could be scaled up and replicated in both urban and rural communities

Objectives

Overarching Objective 1)

The overarching objective is by June 2022, to have developed, tested and established a sustainable and replicable community energy business model for EV charging.

To achieve Objective 1) the following will need to be achieved:

Objective 2)

To have built a decision-making tool to choose optimum locations for community owned EV charge points based on criteria such as: air pollution indices, socio-economic distributions, DNO grid capacity, EV owner requirements, local community transport needs.

Objective 3)

To have developed the financial model which combines the income & expenditure from PV ownership with the data points and income streams relating to EV charging, and later battery storage* and flexibility services*.

Objective 4)

To have created an effective ongoing communications strategy, for both B2B and B2C channels alongside stakeholder management and community engagement.

Objective 5)

To have worked with local community stakeholders to understand their requirements in terms of sustainable transport and to ensure ongoing delivery of benefits to meet those requirements

*N.B. due to changes in project scope and budget, it was decided to not integrate batteries and flexibility services into the project and so, although these were part of the original objectives, they are not referenced further in this report.

Section 2: Summary of key learning about the business model

Lessons learned

Technical:

- The existing electrical load on a site needs to be considered before a charge point can be installed
- The output of a charge point may need to be downrated if only a 32amp fuse board is in place
- A 3 phase electrical supply is needed for 22kW charge points
- It's difficult to know whether for any charging event, whether the load is being drawn from the grid or electricity from the PV. This can have a significant effect on the project business case as if from the PV the cost per kWh may be say 10p but from the grid could be e.g. 25 to 30p.
- The Pod Point charge points we used didn't allow us to identify the source of electricity for a charging event, but we understand newer solutions (perhaps Zappi?) might exist and we would recommend identifying the source of electricity for charging where possible to be an important criteria.
- For 7kW charge points the District Network Operator only needs to be told post installation, though we understand for 22kW and higher permission to connect in advance may be required
- Tender for charge point providers - we did this nearly 2.5 years ago now so the market will have changed but we certainly recommend researching various suppliers and technologies before getting quotes. Look beyond just the equipment, include assessment of the software for controlling the charge points, the data extraction and the customer support provided.

Commercial

- Using a local electrician (registered with the charge point supplier) for installation can work out much cheaper
- Avoid long trench digs through tarmac & concrete and if possible site the charge point on a wall close to a main distribution board. Minimise groundworks which can be more costly than buying the EVCP hardware.
- Ensure you are clear on what specification kit is required before purchasing as refund/replacement processes can be complex
- Price – varies quite widely across suppliers and there are deals to be done if happy to negotiate.
- Usage – worth modelling potential usage at location to maximise ROI and avoid stranded assets. The level of EV charging usage at potential sites may be low at present but that will grow significantly in the next 3 to 5 years.
- With rapidly increasing wholesale electricity prices it's worthwhile monitoring whether the grid price of electricity at a site has increased as this may mean the charging tariff needs to go up otherwise EV drivers may be provided with electricity at a loss.
- Equally if there is a technical solution to identify that the electricity used for charging is supplied from the renewable source rather than the grid, then the cost of electricity in the charge point business model will be much cheaper and improve the return on investment.
- As with any business model success come from increasing income & minimising expenditure. Thinking in terms of the '4Ps' of place, price, product & promotion, the locations that will be commercially viable for charge points therefore are those where EV drivers are likely to park as it is a work place/destination or close to busy roads, the tariff for charging is in line with other local charge point operators, the equipment functions well and is simple to use, the EV driver community is made aware of the charge points. On the cost side, economies can be made through lower installation cost, using local qualified electricians, choosing equipment that represents value for money, using simple legal arrangements and getting the site to add the charge point to their existing insurance policy.
- Use of electricity from the renewable source for charging could be increased by using a separate battery system, that then can be used to charge the vehicle. In the end we didn't look into the cost/benefit of including batteries

in the design, however as battery prices continue to fall this will become a more attractive and commercially viable solution.

Location

- Choose a location with a 'closed community' of drivers e.g. day long staff parking or a location open to the public that has or is predicted to have good turnover of visitors e.g. a leisure or retail attraction would make the likelihood of a post FIT PV array being economically viable.
- As well as considering the likely EV driver numbers, we have taken the approach of finding a location to install a charge point that meets our budget as the install costs can vary quite widely depending on equipment upgrade requirements, 'hard' digs needed and distance from distribution boards.

Administration

We have realised that while the administrative side of installing and running charge point should be 'light touch', in reality some time has to be budgeted for both the setup of the charge point on the back office systems and the billing and reconciliation process. At present we are choosing to do that annually instead of quarterly as the revenue at many of the sites doesn't warrant quarterly billing.

Insurance

Getting insurance cover for the charge points is affordable where we have existing solar arrays, however where we don't own the solar PV we have had to pay around £300 per year to insure charge points which may not generate that much in revenue this year. This seems to be another example of the market for charge points still being at an early stage as the risks of them are not yet well understood. A recommendation therefore is to 'shop around' for quotes as the insurance market for charge points is perhaps not well developed yet.

Legal

Ideally work with sites that are happy to use a licence agreement and don't need to use a solicitor. That is a much simpler approach and where a lawyer is involved at say £300 per hour then a mere day and a half's work might amount to £3600 which is the typical cost we found of an installed 7kw charge point. So you can see that if solicitor's costs are added to the install cost then a payback period might be doubled and the economic benefit significantly reduced. Also involving a solicitor is inevitably going to add a few weeks or months longer to the project lead time.

Our conclusion to date is that we are still at an early stage of the evolution of legal agreements for 3rd party charge point ownership models, and the somewhat cumbersome lease model is still being required by lawyers when a much less complex licence makes more sense. It does seem however that a quite small capital value item such as a charge point can be as complicated to get a decision on and get legal agreements signed as a £200K solar array.

It is doubtless a simplification, but experience suggests that the culture of a larger organisations can be more risk averse and thus the likelihood of using a lease rather a licence is higher. Where possible we choose to work with SMEs on our solar PV projects for this reason, and we would recommend considering SMEs, or public organisations with local decision making, for charge point projects.

Benchmark other cities/communities:

- We have used research from places with more advanced EV infrastructure to inform where site chargers e.g. Dundee, Cambridge, Milton Keynes

- Understand the factors for higher EV usage and where drivers prefer to charge. We keep abreast of latest research and developments of rollout of EVCP networks and hubs.

- Learning from similar business models e.g. Charge My Street, Electric Corby

Project Management

- Doing the project part time a few hours per week has meant lead-times have been long and stretched out and on reflection it would have been better to have compacted the project length by working solidly on it say 2 to 3 days per week alongside other responsibilities.

We originally planned an ideal phase by phase install of charge points at different locations but due to very different decision making timescales we just had to adapt to install once the relevant legal agreements were in place at each site.

Section 3: Detailed description of your business model – as it could be

Background

State of the Solar PV market

Since the Feed in Tariff (FiT) finally ended for Community Energy groups in 2020, approximately 40% of the income from installing a solar PV array has been lost, if deemed export income is included. There was therefore a significant slow down in the volume of community owned renewables and PV in particular being built. Covid related disruption clearly contributed to further delays.

Community energy groups have therefore been looking into finding new revenue streams and business models, and hence the Next Generation programme, that supported 11 different innovation projects, has been such a positive contribution to the sector.

Since 2021 and the increased 'net zero' awareness through COP26, and now with the inflation in energy prices due to global supply chain issues and the invasion of Ukraine, the attractiveness of installing renewables and PV specifically have improved. Installation costs and lead times have increased but given electricity prices may have doubled or in some cases tripled then the payback period of PV will have come down from 8 to 10 years to perhaps 4 or 5. Clearly however current electricity prices may fall back after perhaps 3 years, thus extending the payback period. Present PV installation rates have significantly increased, with installers anecdotally telling us that they are busier than for a long time.

EV adoption & uptake

EV uptake is anticipated to grow significantly in the 2020s, and the latest statistics (April 2022) from the Society of Motor Manufacturers and Traders 1 shows the sales of new battery only EVs (BEVs) to be up 40% year on year despite the overall new car market having reduced by 15%. The sales of second-hand battery electric cars more than doubled (120.2%) in the first quarter of 2022. The UK Government announced the end the sale of new petrol and diesel cars and vans by 2030, with all vehicles being required to have a significant zero emissions capability (e.g. plug-in and full hybrids) from 2030 and be 100% zero emissions from 2035.

However, in our research[3], the top three reasons that individuals had not yet made a switch to an EV related to location and availability of charging infrastructure.

In addition, the corresponding growth in EV charging infrastructure required to support these EVs will put additional strain on the UK electricity system. Siting EV charge points alongside on-site renewable generation would therefore both reduce the requirement to reinforce or upgrade local grid capacity, and ensure that EV charging can benefit from low carbon electricity supplied by on site generation.

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[1] Stats for April 2022 https://www.smmt.co.uk/vehicle-data/car-registrations/

[2] https://www.smmt.co.uk/2022/05/electric-vehicles-energise-used-car-market/

[3] Attitudes to electric cars, solar PV and Community Energy research, Brighton Energy Co-op 2021

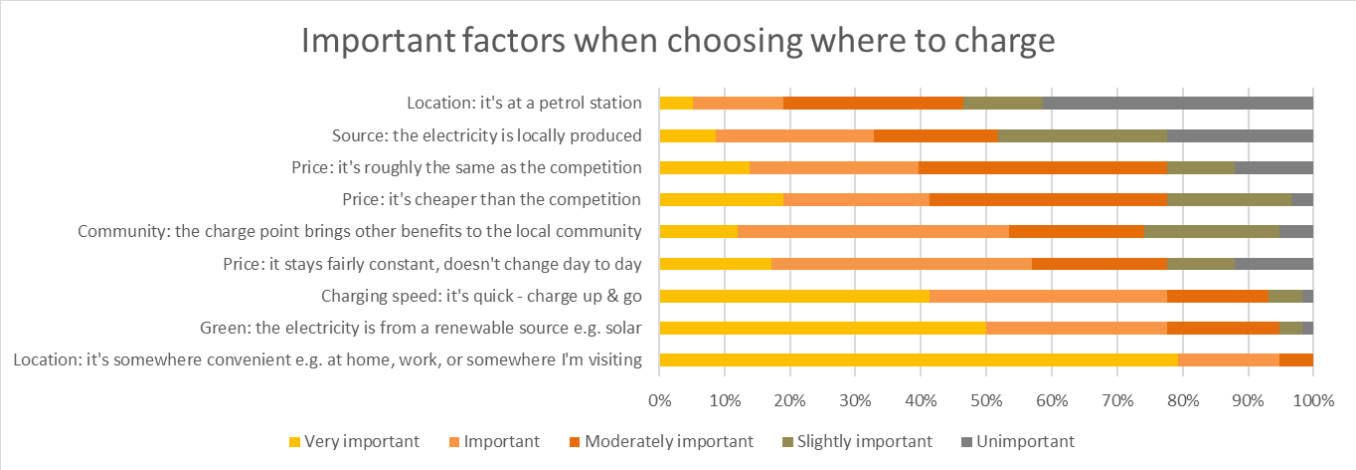
Section 4: Project Details & Tools Developed

Site Selection

Objective 2)

To have built a decision-making tool to choose optimum locations for community owned EV charge points based on criteria such as: air pollution indices, socio-economic distributions, DNO grid capacity, EV owner requirements, local community transport needs.

Our research[4] told us that convenient location was the primary influence for where EV drivers choose to charge up. A green energy source was however the second most important factor.



This could be a consequence of those that choose to respond to a survey about electric vehicles are by nature early adopters and / or be more environmentally motivated than the wider general public, but these two in combination i.e. choosing the right location and emphasising the renewable energy source, give a strong unique selling point for the BEC proposition.

However, lack of charging at home, and not enough public chargers were the first and third most popular reason for respondents who had not yet made the change to an electric vehicle.

In selecting locations for charge point installations BEC worked with the following criteria

- Must have existing solar PV or other renewables, ideally owned by BEC
- Cross selection of location classification i.e. user types e.g. workplace, residential, destination
- Mixture of urban / rural
- Pass site survey requirements

The requirement for existing on site renewables necessarily limited the choice of locations where we might link charge points to PV.

EV charging locations can be classified as follows:

- Residential homes
- Workplace e.g. employees, fleet
- Destination e.g. supermarket, tourist destination
- Public e.g. on street, car park
- *En route* e.g. service station

[4] Attitudes to electric cars, solar PV and Community Energy research, Brighton Energy Co-op 2021

In order to test the commercial viability of sites with a selection of EV user types, and to identify viable niches for the community group PV-EV business model, different host location types were selected based on the following criteria:

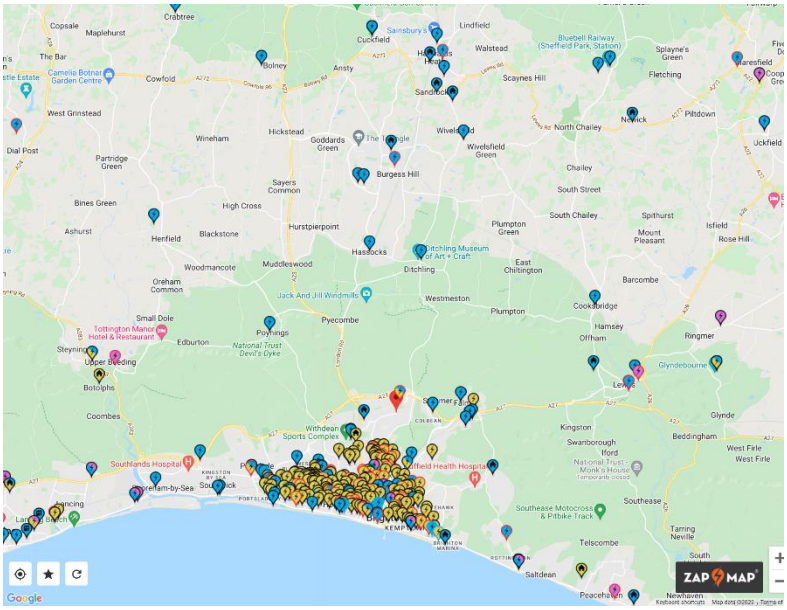
1. Residential: Of the 28mil UK homes, 4.2mil are multi occupancy residences. These have additional hurdles to overcome when considering the installation of EV charging infrastructure, such as
   - Who pays for the infrastructure? The landlord / freeholder, the EV owner?
   - Location? Shared carpark vs allocated parking space
   - Number of interested parties – landlord, residents association, residents,
   - Technical difficulties: which MPAN? Source of electricity, robustness of the landlord electricity supply infrastructure etc

   But any renewables on multi occupancy residences are often only supplying landlord areas such as hallways rather than individual homes, and therefore have a surfeit of electricity generation that could be used for charging EVs. Multioccupancy buildings typically have a large roof spaces. A community group approach to ownership of the EV charging infrastructure, combined with rooftop solar, has the potential to overcome many of the hurdles listed above.

2. Workplace: Large companies and fleet operators are installing their own EV charge points alongside their transition to electric vehicles. However, 99% of the business population are small or medium enterprises (SMEs)[5]. For these 5.5 million businesses, there are also hurdles to installing EV charging infrastructure that community group approach may help to overcome:
   - Who pays for the infrastructure? The landlord / freeholder, the SME, the EV owner?
   - Incentive for employer to provide charging infrastructure for employees?
   - Is there enough throughput of charge point users in a day to make it economically viable for the business to invest?
3. Destination chargers: large scale destinations such as supermarkets are already installing their own EV charge points. However there are millions of smaller destinations such as community centres and independent tourist destinations that are suitable for renewables and EV charge points.

Existing charge points & competition

BEC is based in Brighton and its existing solar PV sites are concentrated in the wider Brighton & Hove area. At the start of the project, the density of charge points in Brighton & Hove was considerably lower than at the close of the project. In the intervening period, the local Council has installed over 200 lamp post charge points and a number of rapid charge points for e-taxis but open to the public. Electric Blue also won the contract to be charge point operator for the city, and have set a standard tariff for charging of 26p which we therefore chose to replicate.



Due to the density of EV charge points being installed by Brighton & Hove Council & other providers, we are in a very competitive area in which to install new charge points.

[5] https://www.gov.uk/government/statistics/business-population-estimates-2021/business-population-estimates-for-the-uk-and-regions-2021-statistical-release

Installation is not uniform across the city, however, and as can be seen from the map, the rural areas outside the city are poorly served as are the less affluent urban neighbourhoods.

Large scale destination locations such as supermarkets are installing charge points which are free to use at present. Brighton & Hove rapid taxi chargers were also free to use for a significant period. Knowledge of competition in the local area is therefore a significant factor for community groups in choosing where to site their EV charge points.

Forecasting future EV uptake & charger volumes required

As part of a consultancy package from CENEX, we also received a modelling tool for predicting future growth in usage & therefore volume of charge points required. We have included the modelling tool as an appendix to the report.

Further Optimisation of location

During this project, BEC also collaborated with the University of Brighton School of Architecture & Engineering, mentoring a final year student dissertation[6] wherein socio demographic data was overlaid with existing charge point and renewables installations to identify locations where charge point & renewable installations could be feasible in order to underrepresented demographic groups. This identified a further 3 sites in the city that could be suitable for solar PV and EV charge point to service under represented groups. Similarly an overlay of emissions data could be used to define target areas with poor air quality.

We also received input from Daisy Goaman at CSE on factors such as demographic data, NOx emissions for siting our charge points. This spreadsheet is also included as an appendix at 'Brighton Energy Sites input on demographic data'

Assessing Site Suitability

Site surveys were carried out and the following installation suitability criteria had to be met for an installation to go ahead:

- Existing and future EV drivers likely to park and use charge points
- Sufficient electrical capacity on site for minimum 7kW charge point
- Parking bay where charge point located close to electrical connection to minimise expensive digging up of tarmac or concrete
- Renewable generation located at the same MPAN
- Site willing to sign either lease or licence for a 10 year rental period
- Site willing to accept commercial terms of 50:50 net profit split
- Access to PV metering data
- Lack of competing charge points nearby

The sites below were the ones that were selected for a charge point:

	Classification	Rural / urban	Density of local charge points	On site renewables
1. Bolney Wine Estate	Destination, workplace	Rural	Low	Solar PV
2. University of Brighton a. Falmer Upper Car Park b. Falmer Lower Car Park c. Varley Halls of Residence	 Workplace Workplace Residential, workplace	Urban	Low	Solar PV

[6] Installation of Electric Vehicle Charge points in Brighton & Hove; Nat Adamson; University of Brighton School of Architecture & Engineering

3. Maritime House, Shoreham Port Authority	Workplace	Urban	Medium	Solar PV
4. Carden School	Workplace	Urban	Low	Solar PV
5. Amberley Museum	Destination, workplace	Rural	Low	Solar PV
6. Park Gate, Hove	Residential	Urban	High	Solar PV
7. Rathfinny Wine Estate	Destination, workplace	Rural	Low	Solar PV
8. Beechwood Hall Community Centre Cooksbridge, Lewes	Destination	Rural	Low	Wind

Equipment & installer selection

BEC carried out a tender for equipment supply and Pod Point was selected out of 6 respondents as the charge point equipment supplier. A tool for assessing requirements, generating technical specification and due diligence to be aware of was created with CENEX, that can be used by community energy groups is included in the appendices

In terms of installer selection, we created a detailed Request for Quotation overview and detailed specification document (based on the CENEX tool) for suppliers to respond to, and we have included those in the appendices.

Commercials: Forecasting Future Revenues

Objective 3)
To have developed the financial model which combines the income & expenditure from PV ownership with the data points and income streams relating to EV charging.

As part of the project, BEC built a modelling tool to forecast the future commercial performance of an individual solar PV + EV charge point site. Each site understandably has a myriad of variables to take into consideration. The model therefore encompasses variables for:

- The solar installation: size, costs, generation, forecast performance, CAPEX, with/without FiT, etc
- The EV charge points: consumption, CAPEX costs, usage costs at different times of day & energy source, future uptake of EVs,
- Energy costs: solar generation, day/night rate grid electricity
- Revenue generation streams: solar PPA, charging revenues
- Operating costs, equipment replacement costs etc
- Financing costs

The tool enables the user to compare impact of all variables and gives outputs of

- Year on year forecast
- Cash flow
- Internal rate of return

The tool is available for use by community energy groups.

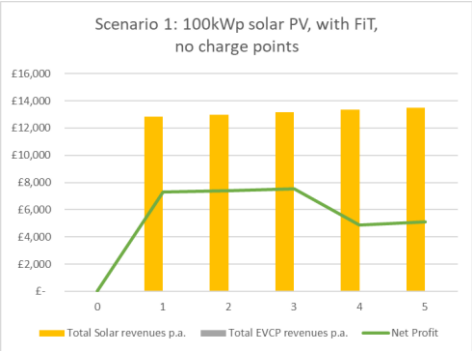
Example outputs

The following graphs show the outputs of the modelling tool for the following real BEC site near Brighton & Hove.

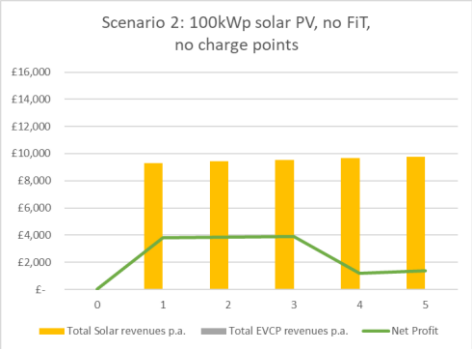
Solar PV		**EV Charge point**	
Solar PV array Forecast generation Feed in tariff	100kWp 95,000 kWh Yes / No comparison	Charge point size	7kW twin
Self-utilisation (average across the year)	80% of solar generated used on site	Site occupancy Charging time	100 days per year, +10% year on year 4 hours
Electricity costs solar generated on site Grid cost import	 £0.11/kWh £0.15/kWh	Revenues Charging price Assumed to increase by	 £0.25/kWh 2.5% per year
Finance	All equipment financed through a community share offer at 3.5%; first interest payable at end of year 3		

Scenario modelling

The over-arching objective of the project is to determine if EV charging can replace the lost revenue from the Feed in Tariff.

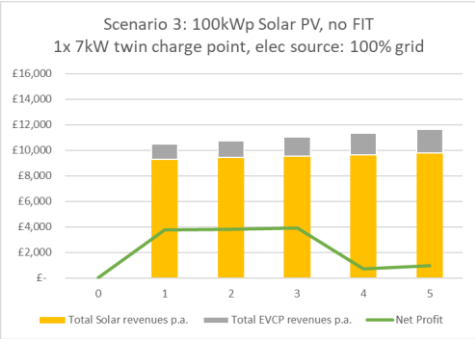


Scenario 1 shows the forecast yearly revenue and net profit from operating a 100kWp solar array on the south coast. 80% of generation is used on site and a FiT of £0.037/kWh generation and £0.05/kWh export tariff was in place. If is assumed all upfront costs are covered by the community share fund. Drop in profits in year 3 are due to the commencement of share interest & capital repayments.



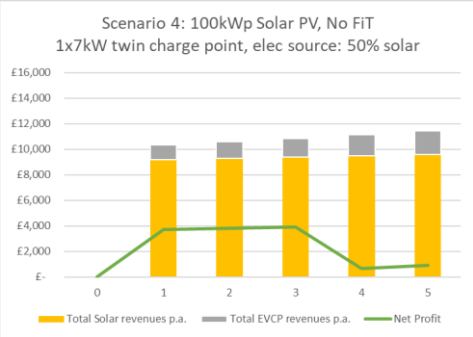
Scenario 2 shows the same site but without FiT revenues. Revenues and profits have dropped accordingly.

Therefore we modelled what would it take to replace the missing of c £3-4k revenue/net profit per annum.

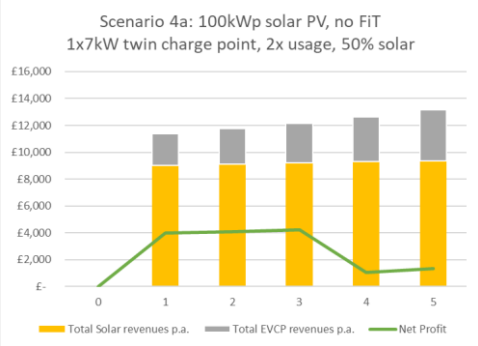


Scenario 3 shows the addition of one twin 7kW charge point (i.e. two charging sockets). It is assumed each socket is in use for 4 hours per day on 100 days per year. This is typical of our larger workplace site, University of Brighton, once staff attendance had increased post Covid work from home. For simplicity it is assumed that the charger is charging from grid as we were unable to differentiate the source of electricity for the charger on site. The additional revenue is clear. However the net profit has dropped particularly in the later years when the charge point warranty period ends and management software costs join the (higher) funding return of capital costs.

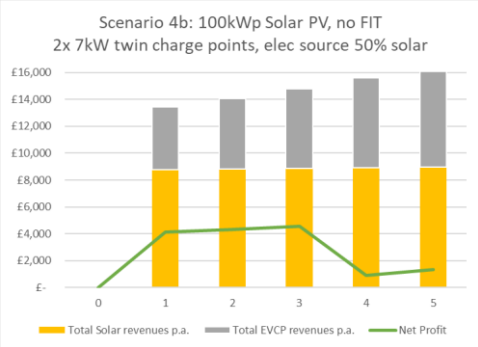
Scenario 4 shows the impact of 50% of the electricity used by the charge point coming from the onsite solar generation rather than exported. This is a close sensitivity as the solar export revenues decrease but depending on arrangements in place with the site the PPA revenues increase and the cost of the charging decreases (assuming PPA is less than grid price). On the modelled site, the solar revenues drop by c£140pa and the costs of EV charging drop but at the levels of utilisation of the charge points (4 hours per day, 100 days per annum) the lower costs were not enough to make up for the lost revenue.



In Scenario 4a, doubling the utilisation rate i.e. ensuring that the EV driver vacates the site once charged, doubles the EV revenues. Net profit also increases. For a workplace site this may be a challenge to achieve if the driver is parked for the day thereby blocking the charging socket from use by a second driver. We are exploring ways to "encourage" drivers to move their car, once charged, with the University of Brighton.



Adding another twin charger increases revenues, increases profits (**Scenario 4b**). The additional upfront cost is relatively small in comparison to total CAPEX costs and is assumed to be covered by the community share offer. The impact on profit of the upfront costs is therefore relatively small as interest and capital repayments are spread across many years.



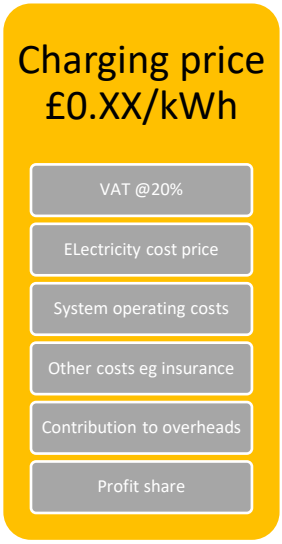
The UK forecast for EV growth is high. The announcement that sales of new petrol and diesel cars and vans by will end by 2030, with all vehicles being required to have a significant zero emissions capability (e.g. plug-in and full hybrids) from 2030 and be 100% zero emissions from 2035 is accelerating the market for new cars; the second hand market is expected to follow. There is therefore need for significant volumes of charge points.

There are many variables to take into account in the commercial model for solar PV + EV charging and all unique to each site. The modelling tool we've developed therefore allows users to play with the variables and see the long term impact.

Towards the end of the project in Spring 2022, we experienced significant grid price increases at numerous sites. At one site day & night rates almost doubled. This makes the business case for an EV charger run on grid electricity much worse, thereby increasing the imperative to be able to determine which electricity source is being utilised at time of charge. In addition, clearly high grid electricity prices improve the business case for solar PV in the first place.

Commercials: price setting

There are different ways in which the pricing for EV charging can be set up e.g. per kWh consumed, per minute, & with a connection fee. With the Pod Point chargers we elected to use their PAYG tariff functionality, charging the driver a price per kWh electricity consumed. This is set up and monitored through the Management Information System provided by Pod Point.



There are two approaches to setting customer charging price: cost plus or market driven. Both were used in this project: cost plus, to ensure there was sufficient profit to share with the sites and market driven to ensure we were not being priced out of the market by competition. We recognised that we couldn't compete with local charging that was being offered for free but there are hundreds of Electric Blue 3kW and 7kW charge points in Brighton & Hove set at 26p/kWh so we set our prices similar to this at 22-26p depending on local competition, cost prices etc.

VAT is charged at 20% on public charging. This therefore needs to be factored into the cost stack to ensure revenues are sufficient to cover costs. All costs are ex VAT.

Electricity cost price: on each site we had at least two potential electricity cost prices: the grid price for the site (which could potentially have a day and night rate) and the cost of the renewably generated electricity – which could be free or on a power purchase agreement tariff. For simplicity we agreed the contracts with the sites based on the grid price at point of installation of the charge point. The business model tool, discussed further above, however allows modelling of grid and on-site renewables electricity prices

During the time span of this project, market prices for grid electricity have undergone unprecedented increases. BEC are going to increase the EV charging tariff from 26p to between 35 to 40p per kWh, as the grid supply price paid by the site may now be 25-30p, and this tariff needs to cover costs and make small profit for both parties.

This creates a problem when some locations such as nearby supermarkets offer free charging and thus drivers are less likely to use BEC's charge points, unless they are in a workplace location where they will be parked all day. It does however make the commercial case for the solar installation more attractive for the host site.

The threat of nearby charge point owners offering zero cost charging is a significant risk for community energy groups, and is a risk that certainly needs thinking through to see what mitigations are available. In the worst case it could lead to 'stranded assets' where the charge points have minimal income and become a cost drain. This is one of the key commercial risks that needs to be considered as part of a charge point project.

Other costs: at some sites we had additional costs such as insurance for the charger. As this is a young market, the insurer took a risk-adverse approach and the separate policy needed cost c£300 for 2 twin charge points. On sites where we had solar arrays already installed the additional policy cost was c£15. At one site where we didn't own PV, the site owner was happy to add the charge point to their insurance policy which similarly cost around £15 per annum.

Contribution to overheads: set up, monitoring of charging behaviours, account management and billing processes have a time overhead for the organisation which needs to be included when costing up the service. We haven't quantified these costs in our first year billing calculations as they were covered by the Next Generation grant, however going forward we will to take these operational costs into account.

Understanding the Electricity Source

Being able to determine the source of the energy used for charging is a key recommendation from this project. With the Pod Point chargers selected, we were not able to determine the source of electricity other than a crude time of day assumption and so had to default to the higher grid price as the known cost in the contract with the sites. We looked into solutions for identifying the source of electricity for a particular charging event, as this would

allow us to know whether the electricity was coming from the onsite renewable generation and thus to cost the electricity differently. As electricity prices have risen to significantly since the start of the project in 2019, being able to use a solar PPA cost of e.g. 13p per kWh rather than a grid electricity price of 25-30p per kWh would have made a substantial difference to the charging tariff set and profitability of the charge point.

We looked into use of monitoring and management solutions such as Wattstor for this purpose, and are aware that charge points such as Zappi may allow electricity source identification, but with the equipment available to us during the project we were unable to reliably determine the source and therefore had to assume grid electricity price.

For organisations taking this model forward, and indeed for our future projects, we recommend adopting a technology solution that can identify and use the electricity from onsite renewables for EV charging, as this makes such a cost and business case viability difference.

Actual performance versus forecast

Actual performance versus the model: for the majority of the project duration, we were either in lockdown or post lockdown home working. The charging levels and revenues at all sites were therefore considerably lower than forecast. Only 50% of the sites made a profit. But the learnings and improved operational set up are already being incorporated into an EDRF funded grant scheme for SMEs that we are managing, enabling them to benefit from solar PV & EV charging combine packages.

Communications Strategy

Objective 4)
To have created an effective ongoing communications strategy, for both B2B and B2C channels alongside stakeholder management and community engagement.

Our communications strategy was divided into 3 phases:

- Preinstallation stakeholder engagement
- Installation
- Attracting customers & ongoing use

Preinstallation Stakeholder engagement

At the beginning of the project a stakeholder map was drawn up identifying the key groups that would need communications and when. In summary these were:

- Stakeholders: Brighton & Hove Council parking team, Councillors
- BEC existing B2B customers & contacts: Existing Solar PV site owners, potential solar PV sites, BEC Members, Local Businesses, Community transport groups
- Individuals: EV owners, BEC members, the wider local population

Stakeholders: In the early stages of the project we contacted a number of city Councillors local to where we might install charge points to understand their views on preferred locations and potential local EV demand. We also exchanged information with the Brighton & Hove City Council Parking Strategy Manager (Paul Nicholls) who was very helpful.

We also met with the MD of Brighton Community Transport to understand their plans for changing their fleet to be electric and thus future opportunities for collaboration on renewables & EV charging locations. So although an important group to bring on side initially to ensure there were no blockers to BEC installing EV charge points, this cohort of 'community representatives' were not critical for the site selection and enduring usage of the chargers. This was particularly the case where we sited charge points at locations with existing BEC owned PV.

BEC Customers & Contacts: this was a key group for identifying suitable sites for installing EV chargers. The following awareness communications were carried out:

- Set up a new section on our web site explaining the project & to generate awareness amongst BEC membership.
- Direct email communications to existing solar PV customers the EV charge points
- Direct promotion of the EV project during routine meetings regarding the solar installations
- Newsletter articles to existing BEC members
- Word of mouth to other community groups, community transport providers
- Publicity and research via the Electric Brighton platform and 'Sussex EVs' Facebook Group

These methods enabled us to draw up a short list of potentially suitable sites: 6 of the 8 final installed sites were existing solar PV customers. Other potential sites from our existing customer base did not progress to installation due to lack of suitability from a technical stand point or timings for the host organisation e.g. not yet making the transition to electric vehicles. Two new sites were gained from our marketing materials: Rathfinney Wine estate saw marketing materials from Bolney Wine Estate and Cooksbridge Beechwood Hall through a call out on the 'Sussex EVs' Facebook page asking members to suggest potential charge point locations.

Communications to customers

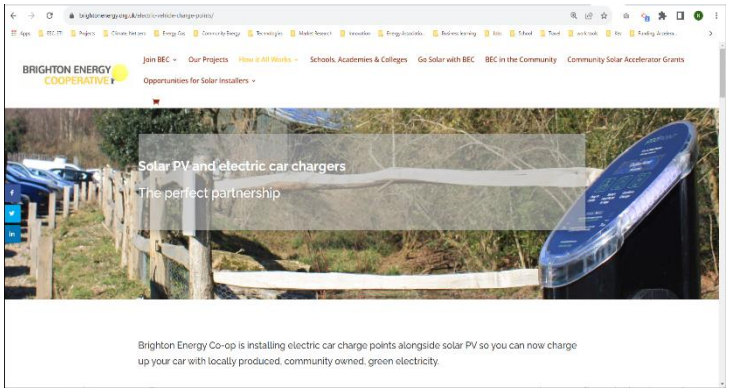
A customer's purchase decision generally follows the following steps:

- I'm aware of the services offered
- I consider the service, price etc and compare to other offers
- I buy
- I buy again

As it is not possible to identify the actual end user of the charge points to enable traditional direct customer communications e.g. email, we generated awareness of the BEC solar linked EV charger through several channels:

- BEC website
- Social media (ours and for EV enthusiasts)
- Site marketing channels
- EV charge point maps

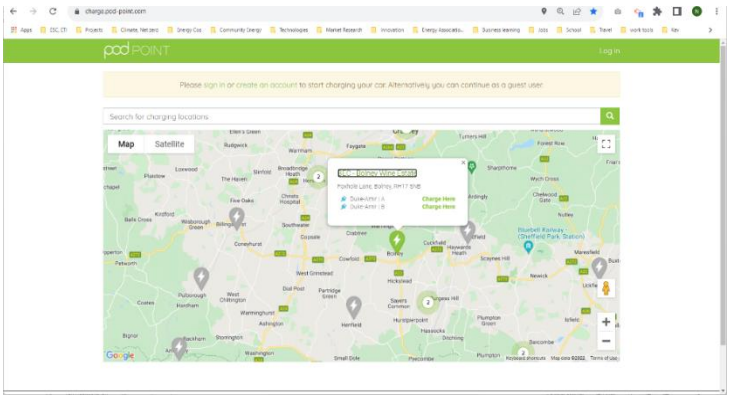
For generating general awareness amongst those that are aware of Brighton Energy Co-op we designed a new web page to act as the central location for all information related to the project – location of charge points, how to charge, and general FAQs about EVs. Effort was put into ensuring that content was optimised for search engines and the page was a source of increased traffic for BEC's web site as a whole.



Regular updates of new charge point locations were added to the web site, included in BEC newsletters and posted on our social media pages.

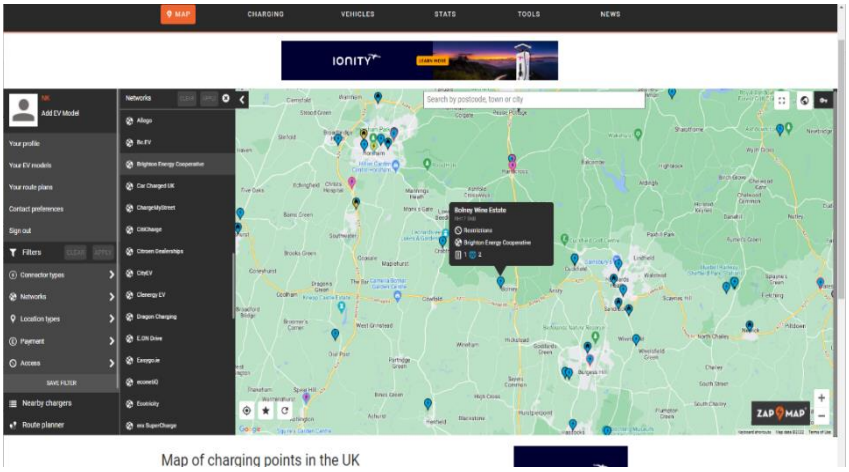
Online EV charge point maps

These are the most important awareness generating tool for EV drivers, especially for charge points that are open to the general public. These also a key part of a user understanding the price to charge and comparing to other chargers in the local area – the consideration phase. Most maps also show the availability of a charger, whether it's out of order and customer feedback from previous users. They are therefore a vital part of the communication to your end users.



Pod Point Live: all publicly accessible Pod Point chargers are listed on Pod Point Live map and on the Pod point app for managing payments.

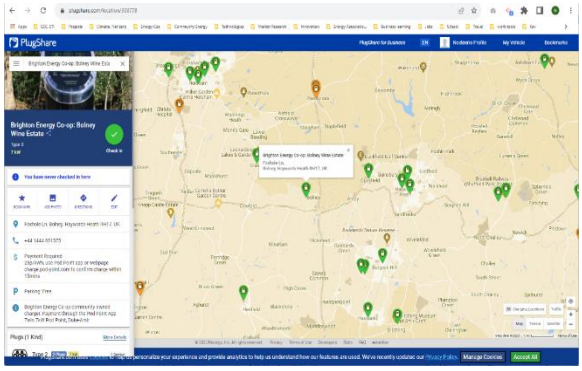
The information that you provide to Pod Point as part of the installation and commissioning determines the correct settings for being visible to potential customers. We chose to incorporate BEC into the site name of each charger to create some awareness of Brighton Energy Co-op and differentiation from the mainstream Pod Point chargers.



Map of charging points in the UK

Zap Map is the UK's most used EV charge point map with over 200,000 users per month[7] and lists charge points from most operators. Pod Point also list the charge points with Zap Map but to create awareness of the solar link and community energy benefits, we set Brighton Energy Co-op up as a network on Zap Map and ensured all our charge points are listed as part of our network. This is an additional small administration overhead post installation of the charge point.

Zap Map Live map can also be embedded in your own website which has a cost of approx. £300p.a. we didn't find this brought additional traffic so won't be continuing.

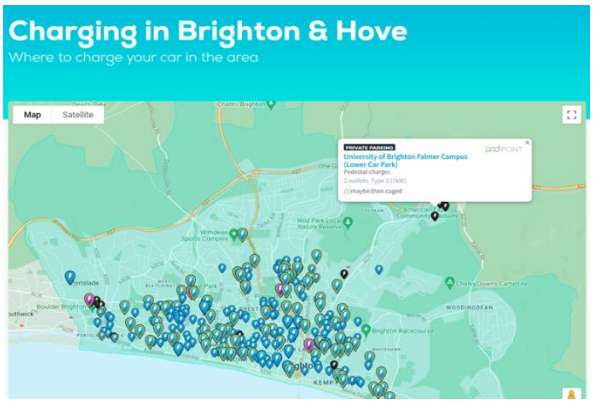


Plug Share is an international online mapping service. This has a very simple interface for uploading charger information.

Charge points can also be loaded onto Google maps directly but we found that Pod Point's process overwrote any updates that we made.

[7] https://www.zap-map.com/home/about-us/

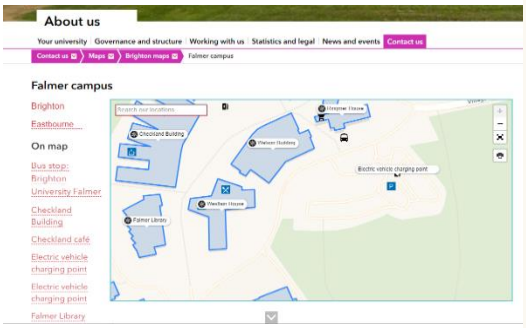
We also made use of localised EV maps such as Electric Brighton where appropriate.

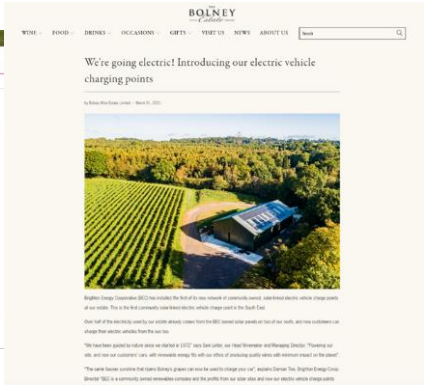


As the Pod Point management information system gives details of location, time and duration of a particular charge but does not share information of the individual that charged. It also doesn't give details of the source of the digital traffic to the charging app/web payment page therefore it has not been possible to determine which of the mapping services drive most users to the chargers.

On site awareness

Depending on the type of site we utilised different communication media to generated awareness that a BEC charge point had been installed. This ranged from postcards through letterboxes and on noticeboards at residential locations, emails to staff via the site host, incorporating into sites' own marketing materials such as web sites and newsletters. Linking to the host sites' own sustainability objectives was key to getting engagement from marketing teams.





A briefing pack was also generated for all the tourist destination sites so they could explain the solar link and answer any other questions that a visitor may have.

Once a user is at the charge point we wanted to generate awareness of the renewable generation being used to power it and of Brighton Energy Co-op itself. We had weatherproof stickers printed and attached to each charger. This contained a QR code which, when viewed through a smart phone, takes the user to the relevant page on BEC web site.

We have anecdotal evidence of repeat usage of our charge points by individual users, particularly at workplace sites. Because the charging data doesn't identify the individual, we are unable to quantify this. The QR code directs users to our web page which has a link to a feedback survey. This was completed only once and therefore we are not able to use this route to measuring customer satisfaction and advocacy.

Our research and that of others has indicated that convenient location is the main driver for a selecting which charge point a driver uses. Therefore putting effort into selecting a viable location in the first instance, particularly whilst the market is in the early stages, generates more success than promoting the installation once *in situ*.

In terms of an ongoing marketing strategy, use of the mainstream EV location maps is key. Because we utilised Pod Point chargers the maps default to showing the individual charger as part of the Pod Point network. Overwriting this to the BEC network was a manual task. The onsite stickers, or with additional cost, an onsite permanent sign is an effective way to create awareness but we couldn't demonstrate this was effective in the customer *choosing* to use our chargers over another.

Customer Insight

Objective 5)

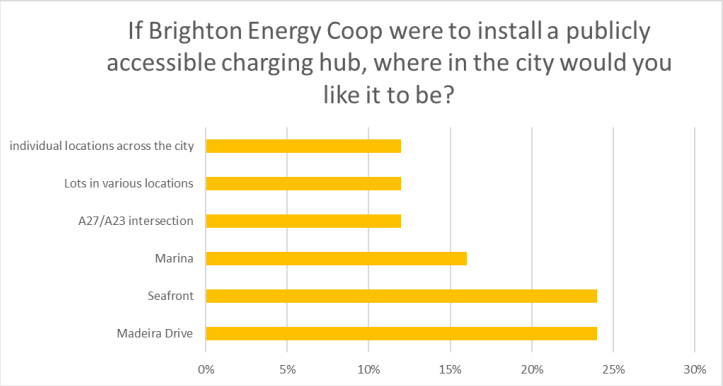
To have worked with local community stakeholders to understand their requirements in terms of sustainable transport and to ensure ongoing delivery of benefits to meet those requirements

At the beginning of the project a stakeholder map was drawn up identifying the key groups who's needs we would need to understand. EV drivers being the key one.

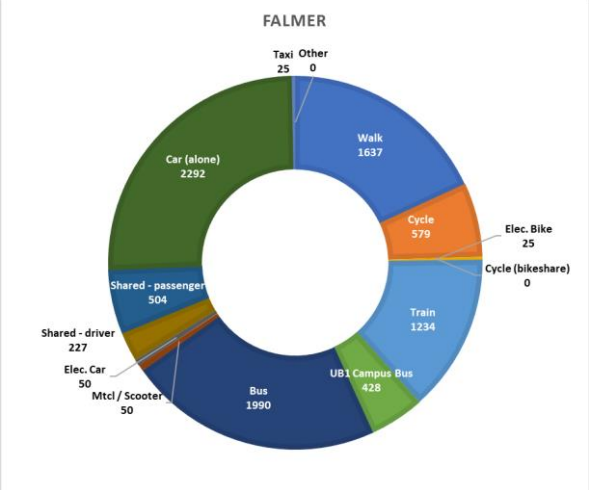
We used numerous surveys throughout the live span of the project to investigate particular questions

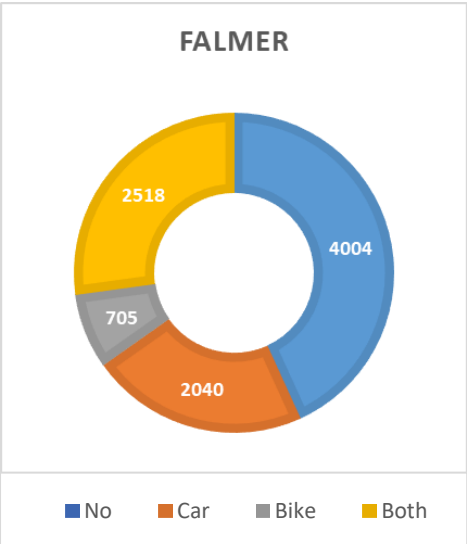
We utilised findings from other surveys, both nationally and locally such as Electric Brighton's Hug the Plug campaign and EV Owners Survey which highlight the needs of EV drivers with respect to charging infrastructure. According to Electric Brighton, 70% of their respondents who already own an EV are unable to charge at home.

In Nov 2019 we carried out a survey via Electric Brighton. At the time they had 513 registered EV owners, 43 responded giving suggestions of where they would like charge points located. The seafront and Madeira Drive (which are a continuum of each other) were the most popular. However the breadth of individual locations and request for "lots in various locations" would indicate convenience of location is important.



The University of Brighton was one of our earliest potential sites. They carry out a regular in-depth quantitative survey of their staff and students as part of their green travel program. Their 2019 survey gave us the unique opportunity to quantify the potential volume of users for EV charge points. Of the 359 survey respondents at the Falmer site, 2 already used an EV to get to campus. The University survey assumed a linear relationship to total volume of people travelling to the site which equated to an existing pool of 50 EV drivers at the Falmer site.



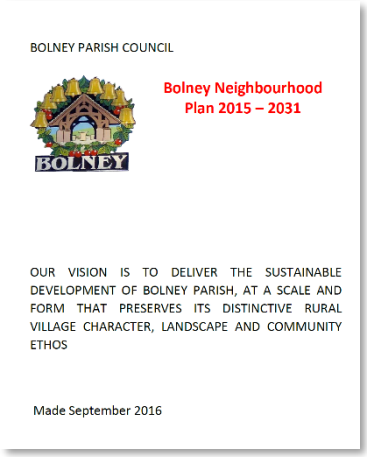


The survey also asked what means of electric transportation was being considered for the future. For the Falmer site over 56% of respondents were considering an EV, equating to potential of 2000 EV drivers for the site in the future.

This closed pool of users was also predicted to give us a pool of regular users.

In order to understand the community needs in more detail at each proposed site, took a multi-pronged approach:

- Reading minutes of council transport committee meetings. These are publicly available and give insights into the local needs and plans from the council.
- Reviewed parish neighbourhood plans, again these are publicly available and often highlight local transport and air quality issues and how the parish wishes to address them. Particularly in rural areas, residents rely on cars more than in the urban areas due to lack of suitable public transport and local demographic characteristics. Bolney Census data shows that the average household in Bolney parish owns 2.04 cars compared South East region figure at 1.35 cars. Moreover, this is increasing faster in Bolney – since 2001, this average figure has grown by 8.5% compared to 3.8% across the South East region. The village has issues with on street parking i.e. not everyone has off street parking or therefore a suitable location for private residential EV chargers. A public charger close by could therefore have community use.


BOLNEY PARISH COUNCIL

Bolney Neighbourhood Plan 2015 – 2031

BOLNEY

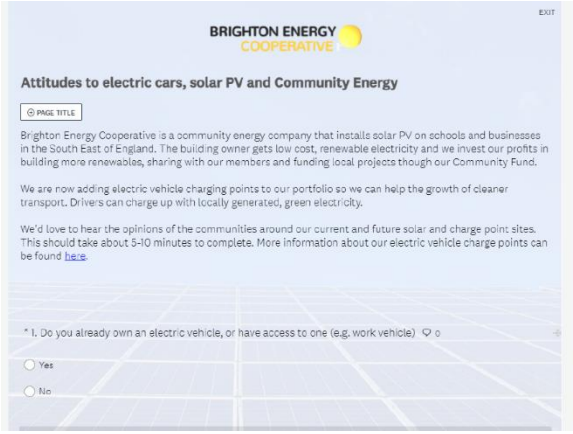
OUR VISION IS TO DELIVER THE SUSTAINABLE DEVELOPMENT OF BOLNEY PARISH, AT A SCALE AND FORM THAT PRESERVES ITS DISTINCTIVE RURAL VILLAGE CHARACTER, LANDSCAPE AND COMMUNITY ETHOS

Made September 2016

- For each potential site, we collected data on number of parking spaces, number of users, number of EVs if known (e.g. staff) and parking patterns (day, night, weekend) to attempt to quantify potential volumes
- We spoke to local community groups to understand their potential shift to electric vehicles. However for all, the current cost of a suitable vehicle was currenty prohibitive.

We also designed a questionnaire to understand points of view of both existing EV drivers and those that don't have access to an EV. Questions covered:

- Levels of current EV access (own, lease or work vehicle)
- Reasons for using an EV / not having made the switch
- Where they choose to charge & why e.g. convenient location, price, energy source
- Different location preferences
- Likelihood to choose a charge point powered by renewables / community group
- Suggestions for locations


EXIT

BRIGHTON ENERGY COOPERATIVE

Attitudes to electric cars, solar PV and Community Energy

PAGE TITLE

Brighton Energy Cooperative is a community energy company that installs solar PV on schools and businesses in the South East of England. The building owner gets low cost, renewable electricity and we invest our profits in building more renewables, sharing with our members and funding local projects though our Community Fund.

We are now adding electric vehicle charging points to our portfolio so we can help the growth of cleaner transport. Drivers can charge up with locally generated, green electricity.

We'd love to hear the opinions of the communities around our current and future solar and charge point sites. This should take about 5-10 minutes to complete. More information about our electric vehicle charge points can be found here.

* 1. Do you already own an electric vehicle, or have access to one (e.g. work vehicle)

Yes

No

A PDF of the questionnaire is included in the Appendices for Community groups.

Prior to installation at a site we circulated the survey. Distribution methods were adapted for each in order to be GDPR compliant:

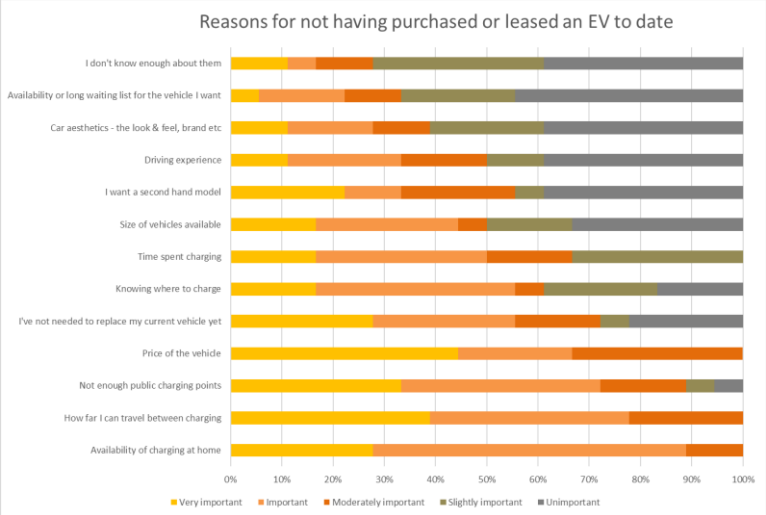
- Companies distributed to staff on our behalf
- Some tourist destinations included a link in newsletters to their mailing lists
- At residential sites we included a QR code linked to our web page & survey on a postcard dropped through letterboxes
- We also posted a link on EV related social media sites

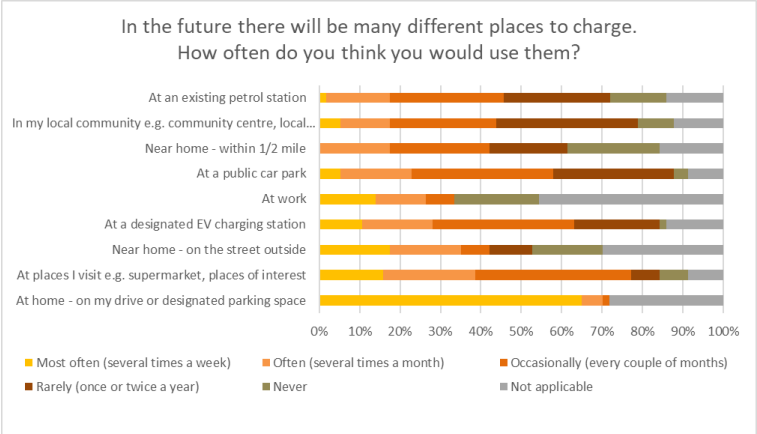
60% of respondents already had access to an EV and 70% of those that didn't were considering buying or leasing in the next 2-5 years. These results therefore can't be considered representative of the community as a whole as the respondents are biased towards considering or have actively made a choice to use an EV. Those that were not interested, didn't respond.

Having access to a charge point either at home or publicly were the 2 top reasons why people had not purchased or leased to date (based on very important + Important scores); Price of the vehicle also scoring highly.

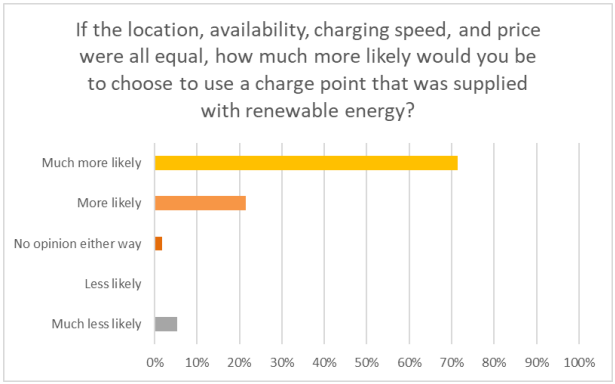
For those respondents not actively considering an EV, using other means of transport and the price of an EV were much stronger influences; neither of these were within our control.

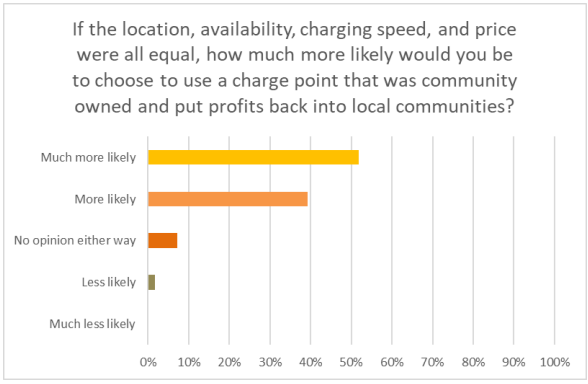
In terms of charging location in the future, at home was anticipated to be the most common charging location.





We attempted to understand the relative importance of renewable electricity source versus community ownership. The renewable energy source was a stronger draw than community ownership





We signed up to several EV user groups on social media as a means of understanding the types of concerns and needs of EV drivers and those considering the switch. The availability of free chargers is a definite risk for the community owned business model. Locations of free charging are understandably widely shared and it has become an expectation amongst EV early adopters.

Section 4: Analysis of potential for wider replication of your business model

Our business model journey

Our Vision for this project was to create an economically viable combination of PV, electric vehicle (EV) charging and batteries that could be scaled up and replicated in both urban & rural communities.

The Business Model that we aimed to examine through the project was a profitable 'package' of PV, EV charging, batteries, location, price and customer demand that could be developed by both BEC and other community energy businesses as a viable product.

Our Aim through the project was to test out EV charging at a number of typical locations to ascertain what mix of location, charge point capacity, pricing and communications campaign will attract sufficient additional revenue from charging to replace the income shortfall from loss of the FIT.

In terms of what we have achieved since summer 2019, we have examined each of the above criteria (other than including a battery) and thus gained understanding of how they would contribute to the business model.

The Challenges, Insights & Conclusions, Lessons Learned and Business Model Outputs described below will help both Brighton Energy and other community energy businesses in choosing which locations the combination of renewables and EV charging will be commercially viable.

Challenges we've faced

Covid related delays

- Access to sites and personnel restricted during the Covid lockdowns
- Covid absorbed management time in many organisations and thus created delays in decision making about projects

- Use of car parking and therefore charge points was much reduced with people working from home during Covid lockdowns, only in Spring 2022 are we seeing occupancy levels in some of the car parks where we have charge points returning to where they were in March 2020.

Legal agreements

On reflection we should have sought out a lawyer to create a bespoke lease and licence much earlier as negotiations took up many months with various versions of legal agreement. In the end we have obtained a bespoke lease & licence agreement that can be used for similar projects without paying for them, but an earlier expenditure would have saved lots of time. We should acknowledge the generous pro bono support of solicitor Sonya Bedford in creating the EV charge point licence agreement template.

Choice of charge points

We ran a tender for charge point suppliers in Autumn 2019 and we have included the Request for Quotation documents in the Appendices. This covers a whole range of criteria to ask potential charge point suppliers and can be configured for an organisation's needs. We had responses from 6 charge points suppliers and our choice of Pod Point was based on a number of factors namely price (second cheapest), inclusion of MIS & warranty fees in the capital cost, local presence of both charge points and senior sales manager Brighton resident, two of our existing partners currently using PodPoint and thus favouring BEC using similar technology.

We chose to purchase charge points but there are other business models available such as leasing or concession schemes where the site owner makes the charge point location available for a certain contract length. Purchasing made more sense for us as we own 80 solar arrays already, but other community energy groups may prefer to lease.

We originally purchased 10 * 7kW twin charge points from Pod Point in May 2020 but realised that each site that decided to work with us had different requirements and we thus needed to exchange some of the equipment we

had bought for alternatives. This took a number of months to get approved through Pod Point management layers though eventually we did get some of the 7kW twins exchanged for singles.

Warranties, data, post installation support and billing
When choosing the equipment supplier ensure you question them on the service level agreements in terms of

- commissioning process and time scales post installation
- set up on apps / customer billing systems
- engineer response time in case of equipment fault / breakdown
- warranty support
- post warranty support costs
- On-going use of Management Information System (MIS) that enables set up and management of each charge point once live e.g. setting charging price, understanding usage statistics and getting revenue, energy consumption and cost information.

Getting charge points set up on the MIS, accessing charging data and access to billing data has proved to be an additional admin overhead.

Customer Experience
Ask questions of the potential charge point suppliers regarding customer experience:

- Where are the charge points promoted e.g. manufacturer's app, map services such as Zap Map
- How does the customer pay? E.g. via an App or contactless
- Understand how/when revenue from the charging events is collected. For example Pod Point chargers have a 15minute "grace period" to allow the EV driver to connect to the app and activate the billing. If not activated the charge stops prior to billing starting but electricity is being used in this time. This is a hidden loss of revenue that can mount up over time / multiple locations.

Supply chain
Brexit and supply chain issues seem to have pushed up raw material costs and delays in availability that we have experienced.

Section 5: Insights & Conclusions reached

- Working with a small firm or sole trader electrician can be much better value than going with the installation costs a charge point provider offers.
- Where possible seek locations that have local decision making and are happy with a simple licence agreement rather than more complex lease.
- Choose locations where the charge point can be mounted to the wall or a 'simple' dig is required. We have installed charge points where we have had to dig up concrete or tarmac and this can increase the cost and effort of installation significantly.
- The location of the charge point and access too is key. As a charge point is effectively a retail proposition then the site needs to be frequently visited, near to major routes or have staff/leisure parking, have the charging fee competitive with fees charged by other operators in the vicinity and be well publicised and visible.
- We intend to progress opportunities related to this business model in future but are clear that it would only be on locations where some of the conclusions above are met i.e. install costs are cheaper due to using a local installer/electrician, the location of the charge point doesn't involve much groundworks, decision making by the site owner Is quick and a licence agreement can be used. If we take the example of a favourable location such as that at Falmer Upper carpark, then the revenue generated by this point will have a much quicker payback period than that of others we have installed where usage is much less.
- We will thus assess on a site by sites basis whether the addition of a charge point will help the business model of new sites for PV arrays.
- A question we have considered is what is the 'Unique Selling Point' for community energy in running EV charge points connected to renewables. Our conclusion is that there is no distinct USP as such, our EV driver research indicates that location of the charge point is most important followed by tariff for charging. The fact that a

charge point is community owned and connected to renewable generation may be of relevance to some drivers but their concerns are largely more of the practical nature of where they can refuel their car and for how much.

- That said we think where community energy can effectively run charge points is in those locations that are underserved by commercial operators, either because the area is less well off or in more rural areas away from the main trunk routes. Indeed by looking at ZapMap, it can easily be seen that the more rural the area the sparser is the charge point presence. The fact that community energy has lower overheads and doesn't need to provide a profit to shareholders means that more rural or less wealthy locations can be made viable, as Charge My Street is proving in the North West & North East.

New opportunities that have come to light as a result of the Next Generation project

As mentioned above we are applying the learning to our £2M ERDF grant scheme as well to help SMEs in the region benefit from combining charging and renewables.

We are also exploring locations across the Greater Brighton region for EVCPs and PV as a combined business model.

Wider replication of our business model

Through the lessons learned, challenges faced and conclusions reached described above we have largely covered the advice for and scenarios in which replication of our business model would be successful. These scenarios have to be where the financial case for inclusion of a charge point is equal to or greater than that of the renewables alone. At the beginning of this report, we said that currently the business case is marginal but with the anticipated growth in EVs in the next few years this should change.

To summarise we believe that an economically viable combination of PV (or other renewables) & EV charging and can be scaled up and replicated in both urban and rural communities if the following criteria are met:

Income optimisation

- Purchasing of EVs continues to grow throughout 2020s driven by targets to phase out ICE vehicles
- The locations that will be commercially viable for charge points are those where EV drivers are likely to park as it is a work place/destination or close to busy roads.
- Local competition - the tariff for charging is in line with other local charge point operators. If there are zero tariff charge points locally you may need to reflect whether your location is commercially viable.
- The equipment functions well and is simple to use and administer.
- The EV driver community is made aware of the charge points, that they are community owned and renewably powered.
- Storage of electricity from the renewable source by using a separate battery system, as battery prices continue to fall this will become a more attractive and commercially viable solution.

Cost minimisation

Economies can be made through:

- Lower installation cost by siting close to electrical connections and avoiding expensive 'hard digs'.
- Using local suitably qualified small electrical firms.
- Choosing equipment that represents value for money to purchase and operate.
- Having a technical mechanism for identifying that the electricity comes from the renewable source, thus ensuring a lower electricity cost for charging and thus higher profit margin.
- Using simple legal arrangements and getting the site to add the charge point to their existing insurance policy.

Community benefit

Once a suitable location for combining renewable energy and charge points is identified and operating on an economically viable basis, then community benefits can also be delivered. These may be 'primary' benefits such as siting the charge points in locations which are underserved by commercial operators and pricing the charging competitively. An example would be working with local community transport operators, and as they change their fleet to be electric community energy groups could provide onsite renewables and charging infrastructure. Indeed BEC have already done such a project in 2016 with the Big Lemon bus company.

'Secondary' benefits would be using surplus income from the project to benefit local community interests. An example of these sort of benefits is that BEC is working with Brighton & Hove City Council, Energy Sparks charity and a variety of local schools on energy use awareness, education, and reduction initiatives.

Appendices – Resources for Community Groups

Business model outputs are listed below:

1. BEC Next Gen PV – EV modelling tool FINAL 2022: An Excel based modelling tool for modelling the site specific financial outcomes EV charge points co-located with solar PV (or other renewables)
2. BEC Calculating EV Charging Profit Template: An Excel based template for calculating revenue and sharing profit with the charge point sites.
3. Example EV Charge Point lease template drawn up by a solicitor representing University of Brighton.
4. Example EV Charge Point licence template drawn up pro bono for the community energy sector by solicitor Sonya Bedford which we have adapted for the purposes of the project and used for a number of sites.
5. EVCP Request for Quotation overview and specification
6. PodPoint EVCP specifications
7. Proposal for EVCP strategy review to BEC by CENEX
8. Request for Information input to CENEX
9. BEC EVCP financial model review by CENEX
10. RFQ Specification tool by CENEX, locked and unlocked versions
11. Usage modelling at University of Brighton sites by CENEX
12. BEC Attitudes to EVs Questionnaire: questions for the Attitudes to electric cars, solar PV and Community Energy research, Brighton Energy Co-op 2021
13. Example of demographic data to inform EVCP location choice from Daisy Goaman at CSE
14. Installation of Electric Vehicle Charge points in Brighton & Hove; Nat Adamson; University of Brighton School of Architecture & Engineering