EXETER CITY FUTURES

ELECTRIC VEHICLE CHARGING WORKSHOP

CITY SCIENCE
delivering decarbonisation

Contents

This summary report has been prepared by Jade Baker-Edwards, Senior Energy & Sustainability Consultant at City Science.

1 Workshop Information

On Thursday 27th October (14:00 – 17:00), Exeter City Futures held an in-person *Electric Vehicle Charging Infrastructure for Exeter* workshop at the Jury's Inn, Exeter. Those invited included City and County Councillors, Senior Officers, Exeter City Futures Partners (Exeter City Council, Devon County Council, University, Exeter College, NHS Royal Devon Foundation Trust and Global City Futures) and other City Leaders. A full list of attendees can be found in the appendix.

The purpose of the session was to gain a shared understanding of the scale of infrastructure required, the status of current Transport Authority plans (Devon County Council) and to inform how Exeter City Council intends to use its own property holdings to install Electric Vehicle (EV) charging infrastructure.

The session also provided space for three commercial companies to present on street residential charging solutions to the group. The solutions shared were:

Chargelight: On street charging utilising existing lamp posts.

Gul-e: A cable channel that is inset into the footway, enabling those without driveways to charge their EVs on the road outside their home, using their own electricity supply.

Co Charger: A charger sharing app that allows those with home chargers to get paid for sharing their chargers with other EV users.

Following the presentations, an interactive EV Charging Collaboration and Strategy workshop (hosted by City Science) enabled the group to consider each of the three solutions listed above in more detail. Split into five groups, the delegates discussed what the priorities should be and the required actions for ensuring we have a robust delivery plan for the city. These discussions were shaped via producing a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis and discussing implementation steps for each of the solutions. At the end of the session each group presented the highlights of their discussions.

The session's programme can be found in Table 1.

Time	Session	Presenter
14:00 – 14:10	Introduction & Welcome	Jo Yelland (ECF)
14:10 – 14:35	Electric Vehicle Charging through Lamp Posts in Residential Street: ChargeLight	Tom Pakenham (Chargelight)
14:35 – 14:50	Exeter City Council Plans for Electric Vehicle Charging	
14:50 – 15:10	Gul-e electric Vehicle Charging System from Oxford	Jason Munro and Lewis Dixon (ODS)
15:10 – 15:25	Co Charger: Community Chargers	Joel Teague (Co Charger)
15:25 – 15:30	Q&A Session	Jade Baker-Edwards (City Science)
15:30 – 15:45	Refreshments	N/A
15:45 – 16:45	EV Charging: Collaboration and Strategy Workshop	Jade Baker-Edwards (City Science)
16:45 – 16:55	Closing Words	Karime Hassan (ECF)

Table 1: Session Programme

2 Introduction and Welcome

2.1 Presentation Highlights

- Electric vehicle (car and van) ownership in Exeter has grown exponentially over recent years.
- At the end of 2020 there were 590 battery electric vehicles registered in Exeter.
- For all 50,400 vehicles in Exeter to be electric requires 317 to be registered in 2021 with exponential growth continued thereafter.
- As of October 2021, Exeter had 49 charging points for electric vehicles. The 2030 charging point target is 778, which if it is to be met, needs the installation of 81 new charging points per year to 2030.

3 Exeter City Council Plans for Electric Vehicle Charging

3.1 Presentation Highlights

Water Lane Smart Grid & Storage Project

- Includes next generation chargers in a cutting-edge system
- The conversion of power takes place within the charging station. This creates a maximum threshold of performance as the output of the charger cannot exceed the installed capacity of the charger.
- The peak power is 550kW. The maximum performance of each charger is 50kW. Under 100% utilisation the system will require load management, further impacting the efficient utilisation of the hardware.
- Using a power stack and satellite configuration allows the power conversion to be centralised. The benefit of this is that the peak power of the chargers is increased to 150kW (in this configuration). The peak power demand of the system is reduced to 440kW while still providing an optimised power delivery under 100% utilisation.
- Carbon emissions reductions pathway reduces carbon emissions from 811 tonnes CO_2e pre-project to -63 tonnes CO_2e in year 6, achieving negative carbon emissions.

Local Electric Vehicle Infrastructure Bid

Four sites have been targeted: (1) Matford Multi Modal Transport Hub (2) John Lewis Electric Car Park (3) Triangle Urban Charging Hub (4) Sub Urban Charging Hubs in Residential Car Parks.

4 ChargeLight

4.1 Presentation Highlights

- ~60% urban homes do not have off-street parking. Residents need an alternative that is convenient, and many won't make the switch without this provision.
- Despite having similar characteristics, EV uptake in Oxford much higher than in Exeter.
- Lamp Post chargers can provide charging infrastructure where it is lacking to improve uptake. More than 7,000 are already installed across the UK (1000 of them are ChargeLight's).

- Primary user are residents and visitors to any area where they are parking for several hours. Typical locations are residential areas. Charging speed is slow so a longer stay is required (full charge in 8 – 10 hours). Cheapest public p/kWh cost.
- Benefits are they can be placed in convenient locations, take just 30 mins to install, no planning permission required, are the best value for money and have an eighth of the carbon footprint. They are also smart grid enabled and can offer smart tariffs.
- Installation requires no drilling into the lamp post and no ancillary equipment inside. Access is quick and simple via an app which is easy to use with a simple payment system and account functionality. Smart tariff capable. 24/7 customer service.
- Lamp Posts located at the back of the footway can be coupled with satellite bollards or a Gul-e solution.
- Exeter and Devon can place a charger on every street at zero cost to the council within 2 years. They can prioritise streets where residents have no off-street parking. All upfront and maintenance costs are covered. The programme can be delivered by Enerveo (Devon's existing streetlighting contractor). Pilots are available with further phased roll out.

4.2 SWOT Analysis

Two groups focused on developing a SWOT analysis for ChargeLight. A ChargeLight expert was present on each group (Tom Packenham and Jeremy Kay).

Strengths	Weaknesses
Cheap(ish)	No revenue to ECC
Available existing infrastructure	Terraced housing challenge? Block of flats?
No planning permission	Would need to partner with Gul-e
No upfront costs for council (unless partnered with Gul-e)	More expensive than home charging (and Gul-e cost)
Feedback from trials (Gul-e)	Universal plug
Tested delivery model	Only one car per post
No extra street furniture	Slow charging
Speed of roll out	Asset ownership? To be negotiated

Regulated electrical connection Potential to vary existing streetlight contract for pilot No maintenance or repair liability Prototyping to understand issues	Procurement process for a trial? Can use existing contracts Wrought iron lampposts Some street lighting at the back of the footway Pricing cannot give income
Opportunities	**Threats**
Could expedite rollout Potential to increase EV use reduce ICEV use Can link to pricing permits residence zones To put in place what residents have asked for Promotes EV purchase Smart grid charging Fast to implement so encourages EV purchases	Blocked by other cars Health and safety of cables Designated space enforcement Influx of non residents parking solved by postcode match on app Points blocked by legally parked ICEVs

4.3 Implementation Steps

The following implementation steps are unordered.

- Establish conditions/criteria for “good locations”
- User EV study – who wants it on which streets?
- Resident user groups
- Establish locations where conditions are right
- Collaboration required with DOC (joint partnership)
- Liaise with car park owners/operators, uni/hospitals/network/private car park operators
- Seek political approval
- Run a trial
- Survey of residents
- Working group for charge light and Gul-e DOC and ECC
- Funding – explore, identify, secure
- Devise alternatives – plan b
- Generate project plan
- Demonstrate benefits to overcome objections
- Consult with garages
- Engage residents
- Establish working group

The second group developed the following, ordered implementation steps

1. Charging strategy development
2. Working group DCC and ECC to create business case.
3. Site visit to existing area and speak to residents
4. Project owner within DCC and ECC with cooperation between DCC and ECC
5. Demographic analysis
6. Look at existing resident interest
7. Identify pilot sites

5 Gul-e by ODS

5.1 Presentation Highlights

- 25% or 6.6 million UK households rely on on-street parking[1]. Residents across the UK are resorting to trailing cables dangerously.
- Gul-e enables residents to conveniently and safely charge EVs on the street using their home electricity supply.
- To charge the user parks in front of their home, plugs the charging cable into their home charger, presses the cable into Gul-e and plugs in.
- Benefits to the user include cheaper charging via home energy rates, reduces trip hazards, convenient, safe and reliable, encourages night charging (better for the grid).
- For the Council, Gul-e supports decarbonisation goals, EV growth, inclusive mobility, provides an income stream, avoids grid connection and reinforcement costs.
- The Gul-e has been designed in collaboration with Oxfordshire County Council's Highway's Authority to ensure it prioritises safety and inclusive mobility. It's also designed to be low maintenance, high quality and at an affordable price point (£500 – £700 dependent on length and volume).
- Currently there are 26 trial units in Oxfordshire (Oxford City and Cherwell Districts), 20 in Central Bedfordshire and more on the horizon. ODS can facilitate trials in Exeter which allows the Council to test the installations whilst developing any required licensing mechanisms required for roll out.
- ODS can support Exeter and Devon in holding a trial and have many guides available for further details (such as a Trial Guide, User Guide, Testing Report, Installation Guide etc). Please contact them if you would like to be sent further information.

5.2 SWOT Analysis

Two workshop groups focused on developing a SWOT analysis for Gul-e. Gul-e experts Jason Munro and Lewis Dixon were present in each group.

Strengths	Weaknesses
Local Authority Trading Company (LATCO)	B2B/LA model – not consumer led
Solution for residents without driveways	Needs Highways Authority approval
Cheaper/cheapest charging rates	Ownership
Low cost installation	Require wall charger
Access to SMART domestic tariffs	Potential conflict with other parking users
Safer on street charging	Raises expectations of charging availability
Reduced distance to walk	Risk of tripping
Combines with other solutions (ChargeLight, Co Charger)	Cost of application processes
	Cost of works

[1] Field Dynamics (2020)

Encouraging night charging (better for the environment) Level of future proofing	Policy of cable management Resourcing application processes Less abled might not be able to use
Opportunities	**Threats**
Potentially no planning permission B2LA economies of scale/purchasing Solution to ton street parking in the EV owners' control EV charging point in no odd road parking areas Could be included in new build plans DCC/ECC trial Becomes specification for new pavements or developments Wide applications	High cost if only in the property in the short/medium term Complex system challenges Legal claims Technology changes (cable thickness) Become redundant due to other charging provision (lamp posts) Need for signage Increased need for all to be able to use any charging provision

3.3 Implementation Steps

The following implementation steps are unordered.

- Political negotiation and understanding of opportunity ECC/DCC
- Project ownership/resourcing
- PyTerra[2]/mapping of (resident) demand
- Pilot
- Process plan (like a dropped kerb)
- Identify funding

[2] PyTerra

6 Co Charger

6.1 Presentation Highlights

- Most people want EVs[3] but only half of UK drivers are likely to get a home charger. People who can't have home chargers aren't buying EVs unless there a convenient, dependable and affordable option. EV users need reassurance and confidence, not just the hardware.
- Private chargers have <5% utilisation and are >99% reliable. They are ideally located for base charging.
- Co Charger provides a convenient, reliable and affordable option. Hosts set up a free account showing location and hourly rental rate. Chargees search for nearby hosts and then book and pay for sessions within the app/ Co Charger deducts 12% transaction fee.
- Community charging can help accelerate EV transition. Homes and businesses can host. In practice they are not a replacement for public chargers but can be an integral part of a charging ecosystem. They improve ROI and reduce risk for public charge point providers by crating customers.
- Community charging is a "free tool in the box". It is the 3rd largest charging network in the UK, leverages over 400,0000 private charging points, has immediate impact and is self-scaling.

6.2 SWOT Analysis

One table focused on developing a SWOT analysis for Co.Charger. Co.Charge expert Joel Teague was present within the group. The following SWOT analysis was developed.

Strengths	Weaknesses
Bookability – predictable park/charge second base charging Community support Easy payment structure	Social barrier – sharing awkwardness Host behaviour – excessive costs Density
Opportunities	**Threats**
Immediacy – easy to scale up Encourage homeowner renewable deployment (commercial gain) Workplace/community tier charger/parking organiser – SME car parks	Grid capacity

[3] Survey by Hive 2022: 54% of drivers want to switch to EVs in the next 5 years

6.3 Implementation Steps

The following implementation steps are unordered.

- Engage: key large organisations, how would they scale up
- Community champions
- Engage: Grassroots, community connectors, how would they scale up?
- Gul-e owners and hosts, charging bay?
- Promotion: EV retailers, suppliers, charger operators
- Local planning: New builds to share chargers
- Comms: hosting, make money, helping community
- Grant (P50?) to share your charger
- Incentive hosts: Sigh up bonus (as host), bonus for recruiting customers
- Target SME car parks

The second group developed the following, ordered implementation steps.

1. DCC strategy approved
2. Survey and data assessment
3. Funding (LEVI)
4. Trial of 1 to 2 streets (6 months)
5. Develop business plan (application management, installation model/framework, inspection data
6. Set up operations
7. Procure providers
8. Launch

7 Summary & Recommendations

In closing, the group's active engagement resulted in many positive conversations and formed nascent ideas related to the collaborative development of EV charging infrastructure in Exeter. ECF's session further provided a prime opportunity for networking and offered clarity on the solutions presented. Overall:

- An overarching theme in the presentations and in the workshop recognised that the City requires a range of charging infrastructure solutions to support the scale of uptake required. A one-size-fits-all response will not suffice.
- Increasing the range of solutions available to the public in the "charging ecosystem" is essential to remove barriers to EV adoption.
- The session highlighted that there are affordable charging infrastructure options which can be rolled out at no cost or low cost to the Council, some of which can offer income to the Council.
- The group exhibited enthusiasm for undertaking collaborative action research in the City, to test out the future demand for the various solutions.

The following key recommendations emerged from the session and could be considered by ECC and DCC.

- DCC and ECC could establish a working group to enable the collaborative and expedited progression of EV charging infrastructure roll out. The working group could enhance collaboration by including Community Action Groups, charging solution providers and other key stakeholders amongst its members.
- Building on the specific solutions explored in the session, the working group should seek to identify other potential solutions that can be rolled out at low or no cost to the council, or that generate income.
- Furthermore, the group could explore the potential for the charging providers to conduct an analysis of the City at little or no cost. An example is the analysis provided in Chargelight's presentation that identified the locations of "charging deserts" in Exeter.
- The working group should aim to develop a charging programme to manage the roll out of a curated and diverse selection of infrastructure that fills charging deserts and meets the needs of residents, commuters and visitors.
- The working group should identify suitable pilot sites and engage early with the private sector to run and evaluate pilots for various EV charging options.
- The working group should engage early with residents to (1) understand where charging infrastructure is required and (2) enable resident buy-in to encourage the later success of installed solutions.
- The group could also liaise with car park owners/operators, universities, hospitals and private car park operators to explore potential charging sites.
- More work could be conducted to look at options for different segments of the population (such as taxi drivers, light good vehicles, residents with no parking, etc).

8 Appendix

List of Session Attendees

Type	Attendee	Organisation
Facilitator/Presenter	Jo Yelland	Exeter City Futures
Presenter	Karime Hassan	Exeter City Futures
Facilitator	Lucy Powell	Exeter City Council/Exeter City Futures
Facilitator/Presenter	Jade Baker-Edwards	City Science
Facilitator	Jo Muncaster	City Science
Presenter/Attendee	Jo Pearce	Exeter City Council
Presenter/Attendee	David Bertram	Exeter City Council
Presenter/Attendee	Tom Packenham	ChargeLight
Presenter/Attendee	Jason Munro	Gul-e by ODS
Presenter	Lewis Dixon	Gul-e by ODS
Presenter	Joel Teague	Co Charger
Attendee	Cllr Martin Pearce	Exeter City Council
Attendee	Cllr Amal Ghusain	Exeter City Council
Attendee	Cllr Duncan Wood	Exeter City Council
Attendee	Cllr Josie Parkhouse	Exeter City Council
Attendee	Cllr Rachel Sutton	Exeter City Council
Attendee	Cllr Peter Holland	Exeter City Council
Attendee	Cllr David Harvey	Exeter City Council
Attendee	Cllr Ruth Williams	Exeter City Council
Attendee	Cllr Paul Knott	Exeter City Council
Attendee	Cllr Marina Asvachin	Exeter City Council/Devon County Council
Attendee	Cllr Stuart Hughes	Devon County Council
Attendee	Cllr Su Aves	Devon County Council
Attendee	Cllr Tracy Adams	Devon County Council
Attendee	Alastair Mumford	Devon County Council
Attendee	Richard Walford	Michelmores
Attendee	Glenn Woodcock	Exeter City Futures/Oxygen House
Attendee	Nic Eversett	Co-Cars
Attendee	Giovanni Currado	University of Exeter
Attendee	Luke Mitchell	Royal Devon & Exeter Hospital NHS
Attendee	Jeremy Kay	Enerveo