

20 November 2024

## **BRIEFING FOR OXFORD CITY COUNCIL CLIMATE & ENVIRONMENT PANEL**

### **High-level Challenges and Constraints Impacting on the Deliverability of Solar Opportunities at Council Car Parks**

#### **1) Background**

To support the UK's commitment of reaching net zero by 2050, 50GW of solar must be deployed by 2030<sup>1</sup> – this is triple the current capacity. The Council has been proactive in installing solar across its estate and currently has over 1000kWp of roof top solar, with another project planned for this financial year. Current generation makes approximately 10% of the Council's annual electricity demand. To maximise generation across assets, initial exploration into the solar canopy potential of Council car parks has begun.

The Council has installed a solar canopy in the carpark at Blackbird Leys Leisure Centre and another has been installed as part of the EV Superhub at Redbridge Park and Ride. However, both are small projects that would not be commercially viable without the grant-funding they received.

To date, the Council has engaged Low Carbon Hub (LCH) to conduct a desktop pre-feasibility exercise focused on the deliverability of carpark PV canopy schemes and the challenges associated with securing customers for energy at such locations. LCH investigated Purchase Power Agreements (PPA) potential with commercial offtakers and have provided insight on the viability of Smart Community Energy Schemes. An exploratory meeting with a solar canopy installer and a Charge Point Operator (CPO) has also taken place.

This paper is informed by officers' discussions with LCH and others and provides a brief overview of the known challenges and potential opportunities associated with these schemes, rather than an appraisal of any particular project proposal.

It should be highlighted that, where possible the council seeks to redevelop car parks and look at opportunities to make most efficient use of land over the longer term - against the council objectives. We have seen this already with plans for city centre car parks. Therefore, any consideration of a solar canopy at a council car park would need to consider alternative options for the site against the payback period for the canopy and indeed redevelopment may present better opportunities to embed energy generation than a canopy alone could.

#### **2) Offtakers**

The most pressing consideration for solar canopy installation is ascertaining what form of offtake is feasible for the location of the solar array. There are three offtake options for electricity generation. These are commercial, smart community energy schemes and electric vehicle (EV) charging. Each of these options have their own challenges and opportunities, and investigations of each are still immature.

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<sup>1</sup> Labour Party Manifesto 2024

<u>Commercial</u>	A private wire is installed behind the meter and the solar supplies a handful of nearby organisations – suitable sites must be very close to the generation site. For this use, it is expected the Council would own the canopy infrastructure and an installer would own the solar for a specific lease period.
<u>Smart Community Energy Schemes:</u>	Residents within the same primary substation area would join the scheme and purchase electricity at a 10-20% discount, whilst the generated electricity would be sold to the grid at a 10-20% higher rate. Collaboration would be needed with organisations Urban Chain or Energy Local to enact P441 <sup>2</sup> and P442 <sup>3</sup> of the balancing code. This might mean more expensive electricity from the grid when the solar is not generating electricity and would require a significant number of homes to sign up to make a solar canopy cost feasible. Other Smart Community Schemes have been proven on a smaller scale.
<u>Electric Vehicle Charging</u>	Potentially most suited to the largest and busiest car parks. An EV Charge Point Operator (CPO) would purchase energy generated from the solar in a use or buy model. The purchase of renewable energy would help towards the CPO's own net zero targets and provide customers with a more attractive offering.

### 3) Challenges

Cost is a concern for solar canopy installations. Due to the infrastructure a solar canopy requires, the average solar canopy installation costs are two to three times higher than the equivalent sized rooftop solar project. Solar canopies below and around 100kWp are generally not cost-effective, with prices exceeding £2000 per kW installed. At around 50kWp, costs can rise to £3000 per kW. Given the fixed costs associated with canopy installations, larger systems are more economically viable. The layout of the carpark also significantly affects costs. The most cost-efficient canopy set-ups involve long, straight rows. Short sections, with few parking spaces at a time, or designs with corners, increase costs due to the need for custom framing.

Given the significant costs involved with installation it is vital to secure an offtaker that can directly use the generated electricity behind the meter. Selling excess power to the grid at 7p/kWh is not commercially feasible; instead selling directly to a nearby business at around 15p/kWh is ideal. However, securing an offtaker who requires a significant amount of electricity and is in ideal proximity to the solar canopy is challenging. Appropriate offtakers are limited by highways, as crossing a road with a private wire to reach an offtaker is usually prohibitive due to the associated costs; cabling routes may be subject to further issues regarding wayleaves and planning consent requirements.

The offtaker needs to be a specific size of business, CPO or community which is ready to receive the offtake. If the offtaker was in the form of a PPA private wire to

<sup>2</sup> [P441 Creation of Complex Site Classes - Elexon BSC](#)

<sup>3</sup> [P442 Reporting chargeable volumes for exempt and licensed supply - Elexon BSC](#)

commercial sites, the model scenario would be two or three customers. Initial analysis into the generation potential of the Council's Park and Rides suggests 2500kWp systems, this would equate to around 2.5GWh of annual demand. However, finding a handful of sites with such considerable demand that are in proximity and willing to purchase is a challenge. For context, 2.5GWh is roughly a third of the Council's entire annual demand across all sites in which it pays the bill.

Timing is also a crucial consideration for PPAs, as in an ideal scenario the contract would begin as soon as the solar is up and generating and would finish when the solar reaches end of life. Additionally, the offtaker would be in contract for a minimum amount of demand, with a 'use or pay' model implemented.

Another barrier facing many renewable energy projects is the current lack of grid connections, since surplus energy generated by solar panels, must be handled by the grid, and this requires a physical connection to the distribution or transmission grid network. The offtaker is also likely to require back-up grid supply, either because of the intermittent nature of some renewable supply, to hedge against the risk of the supplier not meeting demand at peak times, or for reassurance that it can still get power during shutdowns or service failure.

Other challenges include the need to manage rainwater runoff from the solar canopies, which can require the installation of additional drainage across a carpark, which can involve further cost and disruption. This was required in with the solar canopy at Blackbird Leys Leisure Centre.

#### **4) Opportunities**

Solar canopies can offer a host of benefits to the Council by making the most of car park space and increasing energy renewable generation capacity, supporting the UK's commitment to reaching net zero by 2050 and the Zero Carbon Oxfordshire Partnership's ambition to meet net zero by 2040.

Solar canopies could provide an additional source of revenue, making sure all assets are fully utilised. Revenue streams would alter depending on the type of agreed offtaker and even then, could have various of financial models. For example, the Council might finance a canopy 50/50 with an installer, entering in a lease agreement whereby the Council owns the infrastructure, and the installers owns the solar panels, both parties then benefit from a commercial offtaker paying for demand via a private wire. On other hand, if the offtaker was an EV Charge Point Operator, a solar installer might rent the space above the parking spaces from the Council, and then sell the energy directly to the CPO, in this case the Council may be able to gain revenue from both the installer and the CPO. Some models could involve no capital contribution and no operations and maintenance requirements; however, this depends on the model's viability during feasibility testing.

Additionally, PPAs present an opportunity for both suppliers and offtakers to hedge against volatility of energy prices, and deliver on carbon reduction targets, whilst reducing reliance on the National Grid. PPAs offer offtakers a cheaper electricity price which can be fixed, allowing businesses and organisations to budget more effectively. It is worth noting that in the future there may be an opportunity to secure

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the Council's own sites as offtakers, suitably sizing solar arrays to nearby buildings and developments.

**5) Next steps**

It is proposed the Environmental Sustainability Team to engage with the Greater South East Net Zero Hub to explore routes and grant opportunities to support a detailed pre-feasibility for the Council's car parks. Council teams should be engaged to socialise the potential solar opportunities the car parks provide, perhaps most likely associated with the progressive rollout of installation of electric vehicle chargers. It is expected the most relevant teams will be Corporate Property, Property Services, Planning and Economic Development.

Again, it should be highlighted that the feasibility assessment for implementing solar canopies on carparks will need to be set against alternative options and potential uses for these sites.