

**Executive**

**18 March 2019**

Report of the Director of Economy and Place  
Portfolio of the Executive Member for Transport and Planning  
Portfolio of the Executive Member for Environment

## **A Sustainable Future for York with Hyper hubs**

### **Summary**

1. In the context of York being a One Planet City and the council's, environmental ambitions and Sustainable Transport approach, the Council engaged with the Office for Low Emission Vehicles (OLEV) and the Go Ultra Low funding programme in order to further our ambitions in terms of putting in place the infrastructure, in terms of rapid charging points or "Hyper hubs" in strategic locations across the City, to accelerate the change in culture and adoption of Electric Vehicles (EV). In 2016 the Council were successful in the bidding process and were awarded the funding.
2. In the Autumn of 2017 the council had the opportunity to bid for additional ERDF funding to add an innovative layer to the project. This was the addition of a solar canopy and battery storage. This would support the implementation of Hyper hubs for EVs at Monks Cross Park and Ride, Poppleton Bar Park and Ride and York Hospital (this element is receiving funding support from York Hospital).
3. In December 2018 the council were notified by Ministry for Housing Communities and Local Government that our bid was successful subject to legal agreements.
4. The purpose of this report is to update on the project detail, seek approval for creating a budget to accept the additional funding and to seek approval to proceed with the planning and procurement processes in order to deliver this exciting and innovative scheme.

## Recommendations

5. The Executive is asked to:
  - 1) Agree to undertake work in line with the report
  - 2) Recommend to council approval of the budget for the Hyper hubs project (£700k)
  - 3) Note that there are conditions that come with the grant
  - 4) Approve the initiation of the consultation process on design in May
  - 5) Approve the initiation of the planning process after the consultation process has concluded
  - 6) Approve the commencement of the procurement process
  - 7) Note that a report will be brought back later in the year to inform members of the outcome of the procurement process and to ask for approval to proceed to contract award

Reason: In order to move forward and implement a sustainable approach to EV charging to meet the Council's ambitions in terms of promoting sustainable transport, reducing the City's carbon footprint, increasing the use of electric vehicles in the City and to work towards increasing air quality in the City.

## Background

6. City of York council is committed to creating a city which has a thriving local economy, strong communities and a sustainable way of life; a city where our residents are healthy, happy and prosperous. This is consistent with the One Planet approach. The council are taking a lead role in realising this work through a number of projects, including projects around sustainable transport and the environment.
7. The council has invested over years in building EV charging infrastructure in council car parks, shopping parks and leisure centres. This has enabled the uptake of EVs in the city and the transition to cleaner fuels to be accelerated. Council owned charging points have usage rates of over 1500 sessions per month, and have also been a catalyst for the use of electric buses on the Park&Ride network. York is an air quality management area with regular exceedances of NO<sub>2</sub> levels in urban highly populated areas due principally to transport emissions resulting in air pollution. The transition away from polluting vehicles is one which will benefit the health of residents and visitors in York and the learnings from this can be replicated by other cities.

8. Currently, 98% of new cars/vans purchased in the UK are fuelled by petrol or diesel (SMMT 2017). There is an increasing number of Ultra Low Emission Vehicles (ULEV) being purchased which use stored electrical energy in a battery pack. These vehicles are significantly more efficient (4 to 5 times further per kWh of energy) than petrol or diesel cars, with lower CO<sub>2</sub>e emissions. These also have greatly reduced emissions of local air pollutants which cause harm to health.
9. The number of vehicles able to use the existing EV infrastructure is increasing every month and this trend is expected to continue for decades to come. Thus the usage rates of the charge points will increase in proportion to the numbers of users.
10. Many EU countries are expecting petrol or diesel cars to become virtually obsolete within the next three decades. These cars, however, have different refuelling requirements, and currently there is insufficient rapid charging infrastructure provided for the anticipated numbers of vehicles.
11. This project will stimulate the market in York, and provide suitable infrastructure to enable the further transition away from fossil fuel vehicles, and towards ultra low emission vehicles.
12. High power charging brings challenges for the UK local grids in providing short term peak power capacity, and reducing the carbon intensity of fuels from a national grid perspective. The Hyper Hubs aims to resolve both of these issues by reducing the peak power demand on the grid, and prioritising renewable energy supply through the supply of low carbon energy generated on site.
13. On a well-to-wheel basis, electricity is already 50% reduced carbon compared to petrol or diesel. In providing solar generation and energy storage facilities, this carbon intensity can be further reduced by minimising the amount of grid energy required to recharge the vehicles.

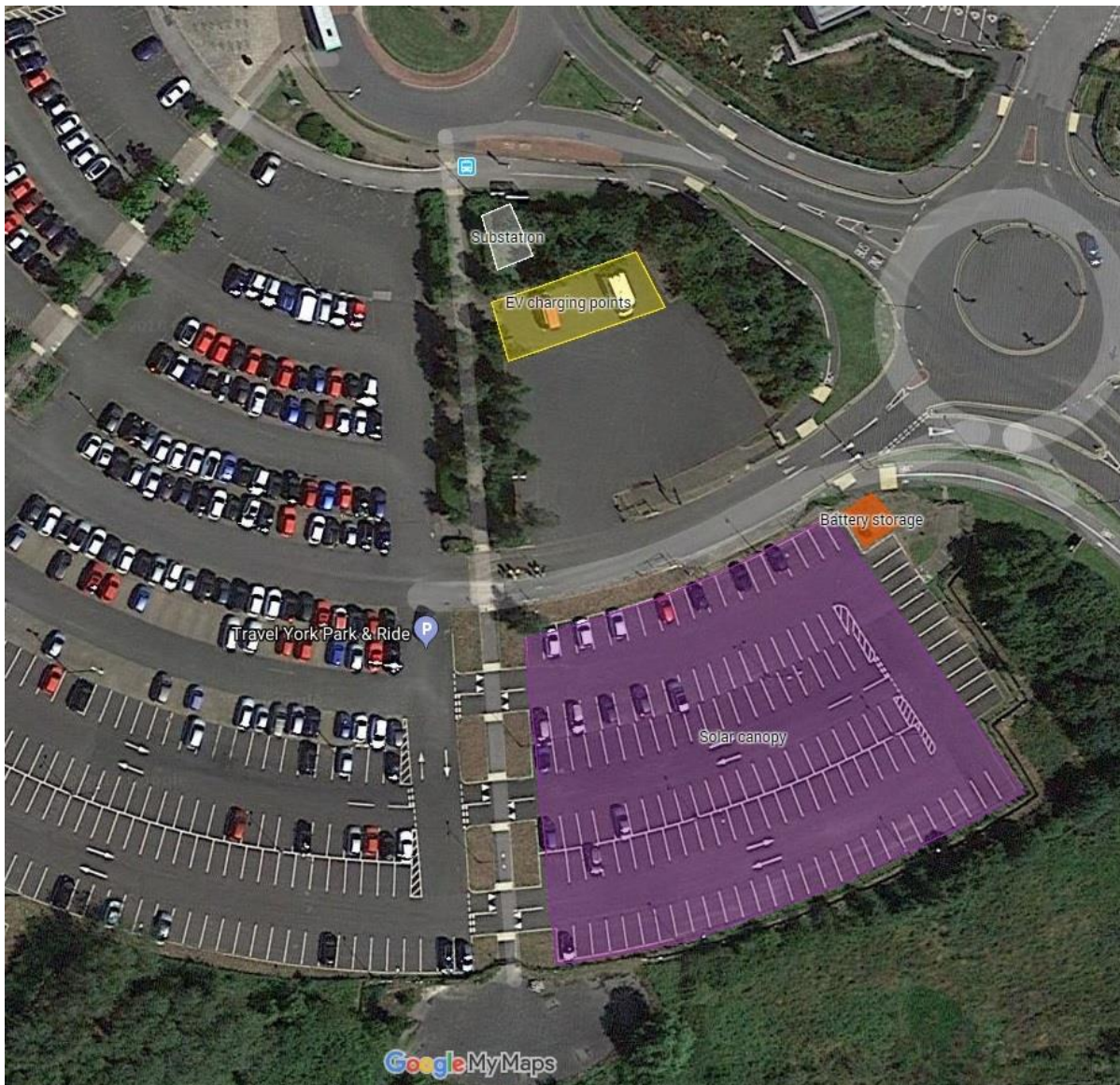
14. Hyper Hubs are an innovative combination of solar energy harvesting and storage with electric vehicle charging points, reducing the reliance of electric vehicles on the UK electricity grid and reducing greenhouse gas (GHG) emissions. By providing Hyper Hubs at Poppleton and Monks Cross Park and Ride sites, we aim to increase the use of electric vehicles for journeys in and to York, providing eight private vehicle charging points at each site.
15. The concept of harvesting solar energy, using battery storage and charging an electric vehicle from the stored energy is one that has already been successfully trialled on a council vehicle at the EcoDepot.
16. In simple terms, on each of the Park and Ride sites, a solar canopy would be erected over approximately 100 parking spaces, providing space for 1,400 m<sup>2</sup> of solar panels. This canopy is an elevated structure – essentially a roof below which cars can still park – with solar panels on the top. Adjacent to the canopy, but not on land currently used for parking, there would be an energy storage facility – a battery. At each site there would also be eight charging points for electric vehicles. Electricity generated by the solar panels would be used to hyper charge vehicles plugged in to the charging points. Electricity not used immediately would be stored in the battery.



17. Above is an image of what the solar canopies would look like. The canopies would use the free space immediately above the vehicles to harvest solar energy to the site. Batteries would then store the electricity,

providing it either to hyper charge electric vehicles when plugged in, or feeding it into the UK electricity grid.

18. The image below shows how Monks Cross Park and Ride currently looks. The boxes on the image represent where the different elements would be located. The purple area is where the solar canopy would be located over 100 of the parking spaces (as discussed, above, this equates to an area of 1400 m<sup>2</sup>)



19. Using a canopy demonstrates a further good use of space in the Park and Ride site. Park and Ride is our existing approach to minimising private car journeys into York. The Park and Ride sites are being proposed for Hyper hubs because they are large sites, well connected to the road network, under Council ownership, and connected to the UK

electricity grid. A further benefit is that electric buses are increasingly being used for routes from the Park & Ride sites.

20. Solar panels are constantly evolving, and the precise details of output will depend on the specification provided by the supplier following procurement. However at current output levels, the 1400m<sup>2</sup> array of panels per site would produce an output of approximately 215,000 kWh per site per year – 430,000 kWh per annum in total for the project.
21. From a technology perspective, the aim of the Hyper Hubs project is to integrate the existing technologies of electric vehicles, solar voltaic panels and battery storage systems to achieve a new and innovative approach to low carbon energy and transport.
22. This will be achieved through the use of renewable energy generation and energy storage to harvest, store, and manage the supply of energy to electric cars via high powered DC ‘Hyper’ charge points. These ‘direct current’ DC charge points supply current at the smooth and constant voltage required for battery charging. This supply of renewable electricity will reduce and mitigate the reliance of electric vehicles on the UK electricity grid.
23. While the UK national electricity grid has sufficient power capability currently for the demands of electric cars, designing a means of mitigating peak power demand from the grid will help to reduce the need for future grid infrastructure investment on a local level and reduce carbon intensity of the supply of energy in the transport sector.
24. The electric vehicle infrastructure element of the project is to purchase and install the DC ‘hyper’ charging points (faster than current ‘rapid’ charge speed points at 50kW) which will supply the energy to the vehicles. These will be installed in a Hub of eight car bays which can supply up to **150kW** power output per car, with a typical charging session taking 10-20 minutes. By way of comparison, a typical home charging point takes around eight hours to charge an electric vehicle.
25. The Park and Ride sites identified will be running electric buses and will have four dual outlet DC Hyper charge points for cars and taxis to use which will enable the number of low carbon vehicles to increase. The solar PV installation will be designed to fit the layout of the sites. Both sites have a south facing semi-circle layout which will allow the sun to be tracked.

26. Each site will have 1,400m<sup>2</sup> of solar canopies providing 200kW of solar generation, with 200kWh of energy storage in 2019. These will use type approved invertors to supply electricity to the hyper chargers, and any excess energy can be exported to the local grid. To clarify, by using an energy storage device, the grid exports are aimed to be minimal i.e. by allowing the vehicles charging to predominantly use the electricity harvested on site.
27. A typically electric vehicle will have between 30kWh and 100kWh of battery capacity. Most vehicles will be able to travel 4~5 miles per kWh. A typical charging session on a 150kW charger would give ~200 miles range in 20 minutes depending on the battery pack's initial state of charge. This is a significant improvement on early generation EVs both in terms of battery capacity, and rate of refuelling. This provides an attractive alternative to the use of petrol or diesel vehicles given there is a substantial cost saving to be made through the use of electricity as a fuel e.g. 2.5p per mile for electricity, compared with 12p per mile for diesel.
28. In terms of the operation of the Hyper hubs, an EV will enter the EV charging point area (as identified in the Monks Cross plan above) and use the rapid charging point until they have the required charge. This will take around 10-20 minutes. Once they are done they will move from the area and park at the Park and Ride or proceed on their journey. In principle the charging bays will not be available as parking spaces.
29. An important element of the project will be testing and adapting to user behaviour in terms of the usage of the Hyper hubs and the project team will build an evidence base over time to inform future use. This adaptability will allow the council to flex its procedures to ensure that the Hyper hubs are used to their optimal level and will meet user need.
30. Early work to consult and develop the council's overarching EV strategy and usage procedures will be undertaken in the summer and presented to Members later in 2019.
31. The landscape for EV charging will change as the market is exercised by projects like this one and it may be in future years the approach differs from the approach in this project, but the long term benefit of harvesting solar energy and storing to feed into York's sustainable energy offer will remain.

## **Procurement**

32. The delivery of these projects will be project managed by City of York Council with suppliers and contractors appointed for the infrastructure works. This will be managed by contract with a consortium of suppliers created to assist with the integration of these technologies and wider industries. City of York Council has already developed experience with the project management of solar and energy storage devices, having participated in an Innovate UK trial in 2016/17.
33. The supply of goods and installation services will be procured in accordance with the Public Contracts Regulations 2015 and the Council's Contract Procedure Rules. Officers from Procurement Services and Legal Services will be on the project team.

## **Benefits**

34. The Hyper hubs will achieve direct benefits for electric vehicle drivers such as taxi drivers, business users, and private car owners in York by providing the infrastructure to enable the transition away from carbon intensive fuels. The Hyper Hubs will not be restricted to certain businesses or groups but will be accessible to all.
35. The Hyper Hubs will provide an alternative for electric vehicles drivers who do not have domestic off-street parking to permit trickle charge overnight. Drivers will have a quality alternative to off street charging which provides familiarity with the petrol forecourt method of refuelling. Each Hyper Hub is intended to be able to accommodate up to 200 car users per day.
36. Businesses will benefit by being able to move away from fossil fuels for transport. For example, taxis can switch to electric vehicles thus achieving lower fuel costs and cleaner air. Businesses and organisations which use cars and vans for fleet travel e.g. NHS can use the fast charging capability to refuel midway through the day and increase the range of fleet vehicles.
37. Lack of off-street parking is a significant barrier to the uptake of EVs (electric vehicles), as the prevailing model involves charging vehicles overnight on a trickle charge through a domestic unit on off-street parking locations. This is a particular issue in York because we have a high level of terraced housing with no off-street parking. The supply of low carbon energy Hyper Hubs helps provide a quality alternative to installing expensive individual charge points in constrained city centre areas where only a grid supply exists and there is little off-street parking.



38. Additionally, there will be indirect benefits achieved by improved health and wellbeing for residents and visitors to the city. Reduced air pollution levels as a result of the increased uptake of electric vehicles. Further indirect benefits will be through improving the energy resilience of the transport network by reducing the need for electricity to be supplied through the high voltage national grid network.

## **ERDF outputs**

39. The Hyper hubs project supports priority 4e (with complementary support for IP4a) - Promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures.

40. The project will support:

- Investment in renewable energy; combined heat and power from renewable sources
- Diversification of energy sources and smart energy distribution through smart grids
- Investment in smart, sustainable urban transport including solving system integration solutions
- Innovation and investment in encouraging the adoption of renewable technologies
- Cut emissions
- Innovative transport pricing
- Energy storage and transmission systems
- A change in behaviours for end users switching to renewable energy sources, reduced carbon footprint and emissions, and a cleaner environment.

## Finance summary

41. The estimated cost of the scheme above, with contingency, is £1.5m.

Funding source	Note	Value
Office of Low Emission Vehicles	Awarded to the council for Go Ultra Low scheme – Rapid charging points	£800k
European Regional Development Funding	The subject of this report. This is the additional funding for the Solar Canopy and the battery storage. This is subject to the signing of Legal agreements.	£700k

42. It is important to note that the Council will comply with the conditions of the award of ERDF funding and have capacity within the Smart Transport team in order to administer the funding and ensure that all activity is compliant.

43. If any additional resource is required to deliver the project this will be absorbed into existing structures and budgets.

## Options

44. **Option 1** is to approve to proceed with the extended project (with Solar Canopy and battery storage) to provide a more sustainable solution for charging of EVs in the City and to accelerate the market in terms of rapid charging provision.

45. **Option 2** is to proceed to build rapid charging hubs (with the OLEV funding already secured) and rely on energy take from the national grid.

## Analysis

46. **Option 1** is the preferred option as it will deliver on the Council's sustainability ambitions.

## Council Plan

47. The Hyper hubs project will deliver outcomes which contribute directly to the following objectives in the Council Plan 2015-19.

### A prosperous city for all

- Local businesses can thrive
- Efficient and affordable transport links enable residents and businesses to access key services and opportunities
- Environmental Sustainability underpins everything we do
- Visitors, businesses and residents are impressed with the quality of our city.

## Implications

- **Financial**  
See paragraphs 36 – 38 of the report.
- **Human Resources (HR)**  
None
- **One Planet Council / Equalities**  
The project will deliver against sustainability outcomes and equalities impacts will be assessed as the project develops.

## Legal

### 48. Funding Agreement

The ERDF funding is predicated on the council proceeding with the project as described in the body of this report. This being solar harvesting, battery storage and rapid charging for electric vehicles.

### 49. Procurement

The supply of goods and installation services will be procured in accordance with the provision of the Public Contracts Regulations 2015 and the Council's Contract Procedure Rules.

### 50. Property

The sites are currently leased to First Bus plc and so consideration will need to be given to the terms of the leases to ensure the hubs can be erected on site. In addition, some of the sites are bound by covenants limiting the use of the sites so these will also need to be considered as part of the project.

- **Crime and Disorder**  
None
- **Information Technology (IT)**  
None at this stage. The Head of ICT will be consulted during the design phase.
- **Property**  
Property services have been consulted on the basic proposals and the implications on power, etc. A representative will be on the project team.

## **Risk Management**

51. As with all leading edge technology projects there is a risk that the technology implemented is overtaken by new technologies, systems and approaches. In order to mitigate this, the council has built into the sustainable transport structure the capability to support the project management and engagement with suppliers. The project is, at an early stage, engaging with experts in the industry to de-risk the adoption of technology solutions.
52. Securing consent for the Solar panels and storage is critical to the projects environmental outcomes. The Park and Ride sites have been selected for their geographic locations and also as there was always an ambition to implement further sustainable transport innovations at these locations.

## Contact Details

### Author:

Dave Atkinson  
Head of Programmes  
Economy and Place  
Tel: 01904 553481

### Chief Officer Responsible for the report:

Neil Ferris  
Director of Economy and Place

Report  Date 5/3/19  
Approved

### Specialist Implications Officer(s) List information for all

#### Financial

Patrick Looker  
Finance Manager  
01904 551633

#### Legal

Cathryn Moore  
Legal Manager Projects  
01904 552487

**Wards Affected:** List wards or tick box to indicate all

All

**For further information please contact the author of the report**

### List of Abbreviations Used in this Report

OLEV – Office for Low Emission Vehicles  
ERDF – European Regional Development Fund  
EV – Electric Vehicle  
ULEV – Ultra Low Emission Vehicles