Internal Scrutiny Committee
Meeting to be held on Friday, 4 March 2022

Electoral Division affected:
(All Divisions);

Corporate Priorities:
Protecting our environment;

Ultra-Low Emission Vehicles
(Appendix 'A' refers)

Contact for further information:
Andrew Burrows, Tel: 01772538540, Fleet Services Manager,
andrew.burrows@lancashire.gov.uk

Brief Summary

The move to ultra-low and zero tailpipe emission vehicles contributes to county council objectives to reduce harmful emissions from its own fleet of vehicles and to improve the environment and Public Health within Lancashire.

This report details measures to introduce ultra-low emission vehicles into the fleet, the challenges this presents and how these can be overcome, and what technologies and options may be applicable to the fleet in the future

Recommendation

The Internal Scrutiny Committee is asked to review and question the direction and progress in introducing ultra-low emission vehicles to the fleet, and the future options expounded in the report.

Detail

Background and present position

The move to ultra-low and zero tailpipe emission vehicles contributes to county council objectives to reduce harmful emissions from its own fleet of vehicles and to improve the environment and Public Health within Lancashire.

Vehicles driven by electric motors, instead of conventional Internal Combustion Engines (ICEs), either through plug in Electric Vehicles (EVs) or Fuel Cell Electric Vehicles will contribute to this goal. Earlier commercially available models did not meet the operational requirements of the various users within the county council, but increasingly models are becoming commercially available with greater driving range

between charges and a greater choice of suitable models. Furthermore, reductions in the price (taking into account the government's plug-in grant) and the overall lower revenue running costs of Electric Vehicles, compared to Internal Combustion Engines, make Electric Vehicles a viable option in more operational scenarios over the whole life of the vehicles.

Because of the high initial purchase costs of Electric Vehicles and other Zero Tailpipe Vehicles, typically from around 25% for cars and small vans rising to around 300% for large heavy vehicles (including the plug-in grant), in September 2021 Cabinet agreed investment of £1.985m to fund the adoption of Electric Vehicles and Zero Tailpipe Emission Vehicles within the county council's fleet. The funding of £1.985m has been provided by the creation of a reserve at the 2020/21 financial year end. Where the projects are capital in nature and either create or enhance a county asset, the project will be included in the capital programme with the relevant contribution from the reserve to fund this, therefore there are no borrowing or interest payments required.

For plug-in Electric Vehicles, a charging infrastructure is required at county council sites where the vehicles either reside or visit. In September 2021, Cabinet approved investment of £1m to fund the installation of site charging infrastructure at county council offices and depots where Electric Vehicles will be based. Funding of £1m has been provided by the creation of a reserve at the 2020/21 financial year end. Where the projects are capital in nature and either create or enhance a county council asset, the project will be included in the capital programme with the relevant contribution from the reserve to fund this, therefore there will be no borrowing or interest payments required.

The county council currently purchases electricity which is generated through renewable sources via its existing energy contracts. The provision of charging points for fleet vehicles will facilitate the reduction of the county council's use of fossil fuels and so contribute to a reduction in the carbon footprint of the council.

A working group of officers from Fleet Services, the Asset Management Service and the Design & Construction Service has been established to manage and direct the installation of Electric Vehicle charging infrastructure at county council sites. The planned locations to install Electric Vehicle charging initially are:

- Bamber Bridge Fleet Workshop (expected installation to be completed 24 February 2022 – Picture 1 (Appendix A) is a photo of the 22KW charging point being used)
- Burnley (Hapton) Network 65 Fleet Workshop
- Caton Hornby Road Highways Depot and Fleet Workshop
- Cuerden Mill Highways Depot
- Whalley Riddings Lane Highways Depot and Fleet Workshop
- Burnley (Heasandford) Widow Hill Road Highways Depot and Parking Services
- Singleton Grange Road Highways Depot and Parking Services
- Wrightington Moss Lane Highways Depot
- Bacup Rossendale Highways Depot

- Lancaster White Cross Parking Services
- Preston County Hall Parking Services

Locations chosen for the installation of Electric Vehicle charges will be those where Electric Vehicles will be based or operate from, and solutions for charging infrastructure will all be site dependent. There is not a one-size-fits-all solution for all sites. Solutions will therefore vary at each site, being dependent on factors such as the capacity of the existing network supply and costs of upgrading; the existing internal site electrical supply infrastructure and costs of upgrading; the volume and sizes of Electric Vehicles based at or using each site and the specific charging requirements, such as the number of vehicles that have to be charged at one time; whether longer duration overnight charging is suitable for some or all vehicles and whether smart charging solutions can be used. Factors that will need to be considered in designing site specific solutions will include:

- Whether it is possible to charge vehicles in turn overnight to spread load and reduce peak supply requirements;

- Charging vehicles only to the level they need for service requirements rather than to a full charge every time;

- Linked to both of the above points, the maximum output of chargers required on each site (this may be a combination of low and higher output chargers);

- The requirements for on demand rapid charging; and

  (Note, higher output Rapid Charging is only possible using more expensive direct current (DC) chargers. Direct current charger units range in cost from around £15,000 to over £50,000 each, depending on power output (not including the costs of upgrading network and site supply infrastructure and other necessary works). This compares with approximately £1,000 each for an 22kw AC charger unit, as to be installed at the Bamber Bridge Fleet Depot. Not all Electric Vehicles are capable of using rapid chargers, and some current Electric Vehicle models can only charge at a maximum 11kw alternating current (AC). As the size of batteries increase, so will the need for higher capacity charging.)

- The usage regimes of vehicles etc.

It will not always be practically possible or economically viable to install either any charging infrastructure at all, or at the capacity required, at every county council location where Electric Vehicles may be suitable operationally. In such cases, other solutions to facilitate the use of ultra-low emissions may be viable, such as home charging by staff for Electric Vehicles or an alternative low emission technology such as hydrogen.

Other factors that will be considered to provide capacity where Electric Vehicle chargers are installed, alongside other requirements for upcoming site electrical supply capacities, are options around wind and solar power that may be used to

charge battery storage during the day when weather allows or, to use an existing network mains supply capacity to 'trickle charge' battery storage at a lower rate. The power held in the battery storage can then be used to supplement a network supply to charge vehicles, either overnight or to provide rapid charge boosts as required, without either the need to upgrade network supply or using lower cost network supply upgrade options.

Fleet Services has three Electric Vehicle vans in service (Pictures 2 and 3 show the county council's Electric Vehicle electric van logo) which are used within the Fleet Service and up to two of these are made available to other services to trial on a medium- or long-term basis to evaluate. Services can determine whether their current operational requirements would be accommodated or whether they may be able to adapt their current operational practices to facilitate using Electric Vehicles, in place of conventional Internal Combustion Engine vehicles.

Twelve electric estate cars for Parking Services enforcement teams have been ordered and are expected to be delivered around June 2022.

Highways Operations will also be an early adopter of Electric Vehicle vans, initially with a minimum of two Electric Vehicles per operational depot, for use by inspectors, but this requirement is expected to increase. Vehicle trials and demonstrations of the latest Electric Vehicle vans are currently being undertaken with the service to see how their initial requirements are best met. This may also increase the initial requirements for Electric Vehicles of the service. The Highways Service has proposed that as part of the decarbonisation of the service, it aims to have 25% of operational vehicles zero emission by 2025, 50% by 2030, and 100% by 2035.

Initially, installation of charging infrastructure will be focused on the locations the above-mentioned vehicles are to operate from, while at the same time considering the future requirements for other services at those sites.

Some services, depending on their operation patterns, may be able to top up or fully charge their Electric Vehicles at commercially provided on-street/service area charging facilities. This is likely to be facilitated through the current fuel card provider.

An issue that potentially restricts the use of Electric Vehicles within Lancashire for some services will be charging opportunities when vehicles are kept at the staff members' home for operational purposes. Such vehicles may not be taken to a depot where charging infrastructure is in place sufficiently frequently to keep the vehicle operating. Commercial, on-street or service area charging may be an option for some, depending on their work patterns, and use of commercially available rapid charging facilities may provide a solution.

An option under consideration is to charge vehicles at the staff member's home but this is often difficult if there is no off-road parking. However, the Highways Service is considering options to facilitate cables crossing a footway safely (Pictures 4 and 5 show footway cable channels) if vehicle charging on-street outside the residential property is available. Options to consider include how the cost of electricity used is reimbursed. Fleet services are considering options that include the use of fuel cards

that allow for electricity used at a residential property to charge a company vehicle to be charged directly to the authority. Also, the tracking system now fitted to all county council vehicles allows for information on Electric Vehicle charging to be recorded remotely that would then enable reimbursement of electricity used though the county council's Oracle expenses process.

The Asset Team have two bridge inspectors, based at home, who visit various bridge sites throughout the county each day and do not regularly visit a county council site. The vans they use are being replaced with Electric Vehicle vans which will normally need to be charged away from a county council depot. As a pilot of home charging arrangements for county council staff, suitable home charging installations will be provided at their place of residence. If for any reason home charging is not applicable or does not provide a full solution, it will be supplemented by commercial on-street charging as a part of the same pilot exercise.

The new tracking and driver behaviour system being installed in all county council Fleet Vehicles facilitates reports on all fleet vehicle usage to provide real data on whether vehicles in their current usage patterns are suitable for consideration of an Electric Vehicle alternative, and for those vehicles, what the minimum specifications should be, e.g. battery capacity (lower capacity batteries are cheaper, charge more quickly and potentially reduce charging infrastructure requirements) and aid specification linked to vehicle manufacturers' data.

Moving Forward

There are now several small vans and cars commercially available with options that will fit in with an increasing number of user requirements within the county. However, although starting to become available (realistically probably 24 months away for the county council), larger Electric Vehicles are still prohibitively expensive in many cases compared to an equivalent conventional Internal Combustion Engine. Range and charging requirements (time and capacity) are still issues that need careful consideration.

What has been considered, but generally discounted, is the use of hybrid vehicles. The green credentials of these vehicles are less proven. They do not, for example, qualify for the plug-in grant because of their real-world emission levels. This in turn makes them more expensive and economically less viable. Likewise, hybrids do not qualify for all Ultra Low Emissions Zones. Many hybrids use petrol engines, rather than diesel, which brings problems for fuelling security (the county council has bunkered fuel stocks of diesel, but on-site storage of petrol has significantly more safety and regulatory requirements and would not be economically viable to do for the number of vehicles that may be put into service. Because of this, there is no plan at present to introduce hybrid vehicles. However, for future requirements, such as heavy trucks or accessible buses (Intelligent Transport System vehicles) diesel hybrids may still be an option.

The other potentially viable option for Ultra Low Emission vehicles within Lancashire is those powered by hydrogen. There are two forms of technology developed. One is the use of hydrogen to power fuel cells to run an electric motor, and the other is a form of Internal Combustion Engine that runs off hydrogen. Both technologies allow

for substantially zero tailpipe emissions and come within the Ultra-Low Emission scope. The use of hydrogen would significantly reduce the cost and infrastructure needed for charging, providing a supply is available locally, especially where the electricity supply network needs considerable upgrading to provide sufficient charging capacity and at more remote sites. At present the nearest proposed commercial hydrogen station is at BOC close to the A580 at St Helens, a few miles outside of Lancashire, but it is expected that provision will grow over the next few years and there may be options for hydrogen fuel to be stored in depots for county council vehicles. For some larger vehicles, hydrogen may be a practical solution for the county council.

The other consideration for the council in terms of decarbonisation will be the source of hydrogen supplied. Green hydrogen is produced by sustainable methods, such as wind turbines or hydroelectric to produce electricity that is then used to produce hydrogen by electrolysis. Blue hydrogen is made from fossil fuels and then carbon capture used to remove emissions. Grey hydrogen is the same as blue hydrogen but where the emissions are not captured. The authority would, as it does with electricity, need to consider the credentials of the supply.

Technology in transport and vehicles, especially Ultra-Low Emissions Vehicles, is constantly changing, and it is necessary to both keep abreast of what is becoming available in the future and to consider how much investment is made in one technology that may ultimately be redundant. For example, the authority could invest many millions in providing full capacity to charge 'unlimited' numbers of Electric Vehicles at all its sites to cover 'expected' future requirement, only to find that current technology in relation to battery vehicles and charging systems is supplanted in the future.

The current and future work on specifying, procuring and installing Electric Vehicles and other ultra-low emission solutions, needs to be considered against the overall carbon footprint of what is done to achieve their use in service. For example:

- The carbon used in providing and installing Electric Vehicle charging facilities;
- The whole life 'cradle to grave' carbon cost of the vehicles;
- Local and national regulatory or statutory compliance requirements, such as clean air zones; and
- Carbon reduction mandates.

All of the above may shift the balance on any solution's real viability.

Consultations

N/A

Implications:

This item has the following implications, as indicated:

Risk management

Under investment in zero emission fleet vehicles will reduce carbon reduction and lower reduction in harmful vehicle emissions.

Local Government (Access to Information) Act 1985
List of Background Papers

Paper	Date	Contact/Tel

None

Reason for inclusion in Part II, if appropriate

N/A