1.Corporate Policy & Resources

Date of meeting 10 October 2022

Title	*Procurement of waste & street cleaning vehicles*
Purpose of the report	To make a recommendation to Council
Report Author	*Jackie Taylor Group Head of Neighbourhood Services*
Ward(s) Affected	All Wards
Exempt	Main report - No Appendix 1 – Yes Appendix 2 - Yes
Exemption Reason	Appendix 1 and Appendix 2 contain exempt information within the meaning of Part 1 of Schedule 12A to the Local Government Act 1972 paragraph 3 Information relating to the financial or business affairs of any particular person (including the authority holding that information). The public interest in maintaining the exemption outweighs the public interest in disclosing as it could put the Council at a competitive disadvantage in the procurement of these goods and services.
Corporate Priority	Community Environment Service delivery
Recommendations	**Committee is asked to:** **1. Recommend to Council their preferred option in Appendix 2 of this report for the procurement of waste & street cleansing vehicles** **2. Recommend to Council the agreed options chosen by Corporate Policy & Resources and the allocation of funding to allow the options to progress**
Reason for Recommendation	*The Council's fleet of waste & street cleansing vehicles are due for replacement as the current contract is due to expire in June 2023. Other owned vehicles within the waste fleet are also due for replacement in 2023. A competitive tender process has been undertaken for all vehicles and services which is compliant with PCR2015.*

1. Summary of the report

1.1 A report was submitted to CP&R on 11 July 2022 asking permission to commence a procurement process for the purchase & lease of the Councils fleet of waste & cleansing vehicles. The current contract is due to expire in June 2023. This report seeks to fully inform all Councillors of the outcome of that tender exercise which was undertaken through the Yorkshire Purchasing Organisation (YPO): -

- Fleet Managed Framework (921) Lot 3 Fleet & Managed Workshops
- Fleet Managed Framework (960) Lot 1 Specialist Vehicles

1.2 The procurement exercise sought to obtain options and prices for both leased and purchased-to-own vehicles that will provide the Council with modern and carbon-efficient waste and recycling vehicles.

1.3 This exercise has also established current and future needs to upgrade current power supplies into the depot to enable the installation of Electric Vehicle (EV) charging points.

2. Key issues

2.1 The Councils fleet of waste & cleansing vehicles are a mixture of owned and leased. The fleet currently consists of: -

Leased since 2017	Service
2	Garden waste
9	Refuse collection
1	Street cleansing/bins
5	Street sweeping

Owned since 2017	Service
4	Food Waste, small electrical & textiles

2.2 There are many new & emerging technologies and fuels coming on to the market and the tender exercise sought to look at all opportunities and options which were viable, available, and affordable and where possible helped with the Council's Climate Change proposals.

2.3 Whilst there will be a ban on the sale of diesel cars & light vans form 2035, the Government has acknowledged that not all commercial fleet operators will be able to switch from diesel to electric trucks from 2035. Following a consultation exercise conducted by the Government it was confirmed that it will end the sale of new, non-zero emission heavy goods vehicles (HGVs) less than or equal to 26 tonnes from 2035, and all new non-zero emission HGVs from 2040.

2.4 Entering a contract in 2023 for seven years with an expiry date of 2030 will afford the Council the opportunity to use this time, before the Government's plans become mandatory, to develop plans which meet targets and ensure that the Council is not entering into a market which is still developing and may very quickly change directions.

2.5 Before going out to the market, Council officers explored fully the technologies which were available and emerging, and the infrastructure needed, whether externally or internally, to run the vehicles.

2.6 Further work was also undertaken to establish costs of fuels and battery charging. This research established that the cost of: -

- Hydrotreated Vegetable Oil (HVO) is approx. 10p more per litre than diesel and
- There is little difference in costs of diesel fuel against electric charging currently, but this has the potential to change in the coming months and years and as renewable energy options increase.

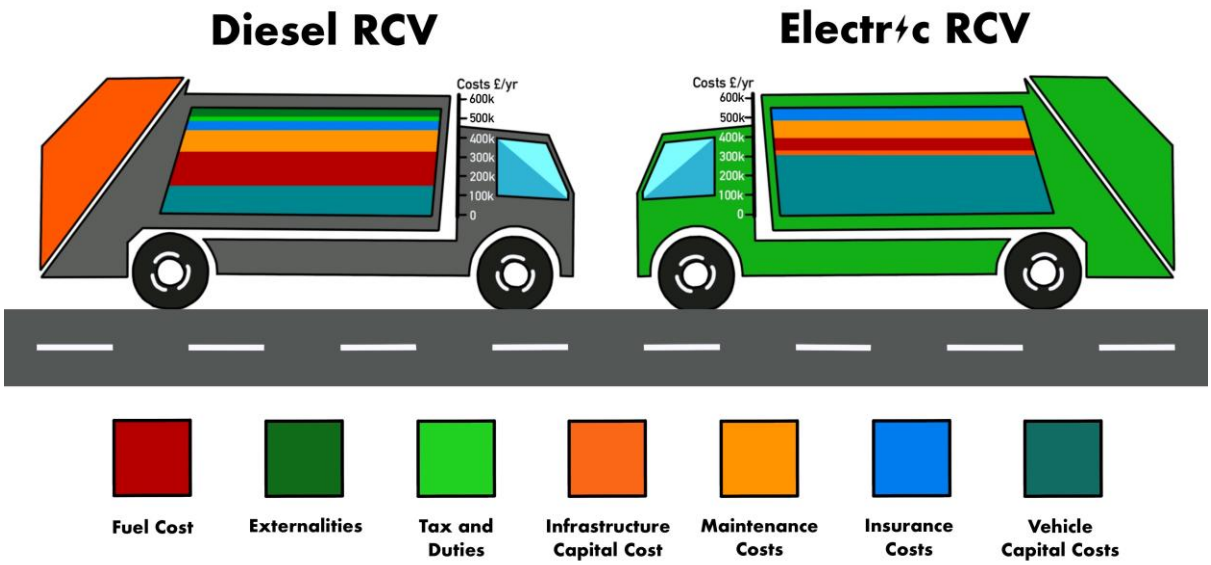
2.7 At present the capital costs associated with Electric Refuse Collection Vehicles (eRCVs) are greater than for diesel vehicles. This initial outlay is mitigated to varying extents, by operational savings resulting from reduced running costs. However, there is currently little published research exploring the business case for eRCVs in a local authority context.

2.8 It is easy to talk in generalities about the pros and cons of technologies such as diesel and eRCVs. A cost benefit analysis (CBA) improves the precision of such conversations, allowing for advantages and disadvantages to be quantified. The table below sets out the CBA for a standard 26T RCV working on a general domestic waste round. This comparison finds that under quite conservative assumptions, the lower capital costs of a diesel RCV are offset by the lower running costs of an eRCV and the total cost of ownership (TCO) of an eRCV is approx. £30k greater than that of a diesel equivalent. This estimate is taken over the average life cycle of approx. eight years and is dependent on quality of maintenance. Whole life costs consider the purchase price, costs to run such as fuel, tax, and congestion charges as well as the cost of maintenance.

The table below makes assumptions around anticipated costs of fuel for both diesel and electric within the operational costs. These are estimates with significant potential for price movements within both fuels.

Vehicle	**Electric**	**Diesel**	**Net Cost**
Capital cost (£)	366,000	164,000	202,000
Operational cost (£)	238,000	410,000	-172,000
Externalities (£)	8,000	50,000	-42,000
Total (£)	**612,000**	**624,000**	**-12,000**
Total excluding externalities (£)	604,000	574,000	30,000

Externalities include environmental and road damage and oil dependence



2.9 While there are several alternative technologies that might replace diesel, one of the best developed is battery powered electronic propulsion, recharged from the electricity grid.

2.10 Research estimates that on average, local authority RCVs emit approx. 330 kilotonnes of carbon dioxide-equivalent per annum. Replacement eRCVs would produce only 40 kilotonnes, a carbon saving equivalent to every person in the UK recycling an extra 250 plastic bottles each year.

2.11 Switching to eRCVs eliminates the biggest source of localised air pollution from standard RCVs which is the diesel itself. Since eRCVs do not burn fuel directly, there are no exhaust fumes, leading to public health benefits. Electricity generation is less emissions-intensive than diesel and the air quality emissions occur further away from residential areas, reducing their impact. Electric engines are also far quieter than diesel equivalents, reducing noise pollution and improving the working environment for collection crews.

2.12 Technology is continuously advancing, and it is not yet clear whether eRCVs will emerge as the long-term solution. However, at present, eRCVs appear to be the strong contenders to take the place of diesel vehicles especially in more urban environments.

2.13 Caution in this BEV market does however need to be exercised as the supply chain for eRCV batteries remains problematic in some respects as does battery disposal. Also, to be considered is the weight of the batteries which can impact on collected tonnage although some manufacturers are replating the vehicles at 27T to help with this additional weight.

2.14 It is too soon to say which technology will emerge as the replacement for diesel, however several technologies are at or near viability.

2.15 Some manufacturers in the USA use vehicles powered by compressed natural gas (CNG) these tend to have fewer negative air quality emissions but offer little or no benefit in terms of CO2 emissions since natural gas is still a fossil fuel.

2.16 Another option used by bus fleets is to replace the natural gas with biogas from anaerobic digestion or landfill. Replacing diesel with biogas is one of the most beneficial uses of the biogas, however unless the UK significantly increases biogas production or diverts it from current uses, supply is extremely limited.

2.17 Electric motors have a longer history than the internal combustion engine (ICE) as a means of propelling vehicles. The motors produce no direct atmospheric emissions through their operation. Although it must be acknowledged that they do place indirect atmospheric emissions through the need to produce electricity for charging. Recent advances in battery technology and regenerative braking are increasing vehicle range, while the rise of renewables means that the carbon emissions associated with generating electricity are falling.

2.18 Waste collection has several structural features making it suitable for electrification, especially compared to other heavy vehicle applications. Firstly, the stop-start nature of collection rounds which puts strain on diesel engines and increases diesel consumption, is better suited to electric engines. Instant torque (the engine's rotational force) helps with the starting while stopping leads to partial recharge of the batteries through regenerative braking systems. Added to this, the short & predictable distances in collection rounds are suited to the eRCV ranges. Vehicles always return to the same depot and use of the infrastructure on site can be maximised.

2.19 Hydrogen fuel cells are used to power some RCVs in Scotland. In this system, the combustion of hydrogen is used to generate electricity on the go, offering an extended range and avoiding reliance on batteries, while producing only water vapour as an emission. However, much hydrogen is currently generated by steam reforming of natural gas, and so relies indirectly on fossil fuel production, although renewable means of producing Hydrogen are gaining ground.

2.20 Tender evaluations have been conducted by Neighbourhood Services Officers and several clarification meetings have also been held. During those meetings it has become noticeably clear that the battery powered market for sweepers and vehicles up to 7.5T is expensive with no payback period.

2.21 **Appendix 1 (a)** contains some examples of tender returns from various companies for both electric & diesel purchased vehicles up to 7.5T as tendered for in **960 Fleet Managed Framework (960) Lot 1 Specialist Vehicles**

2.22 Several potential suppliers did not submit tender returns for the vehicles listed in 2.21 and highlighted some key relevant points: -

- The chassis is sold with a diesel engine
- The vehicle must then go off to a conversion company to remove the engine & gearbox and install an electric powertrain
- The conversion creates an issue for the purchaser whereby they are not in control of the conversion and when problems occur the manufacturer will argue it is a conversion issue and the convertor will argue it a manufacturers issue. There are also issues around manufacturer’s warranty when a conversion takes place

- Due to the weight of the batteries the payload is compromised
- Due to the process for these types of vehicles being new, conversion companies are small entities and are not well established. There is a concern that when problems arise the company may no longer be there to resolve them or take ownership.

2.23 On this basis and due to the extremely over inflated costs we would recommend opting for all diesel engines for these four vehicles.

2.24 **Appendix 1 (b)** contains examples of tender returns from various companies for both electric & diesel leased vehicles as tendered for in **Fleet Managed Framework (921) Lot 3 Fleet & Managed Workshops**

2.25 Both companies who submitted a tender for this framework were comfortable to submit prices for eRCVs but only one would commit to providing a price for electric compact sweepers, neither company committed to pricing for the 16T principal road sweeper.

2.26 There were several reasons given which relate to lack of confidence in battery life and lack of external support in relation to management of the electric vehicles.

2.27 The municipal vehicle market contains several convertors who will install an electric powertrain into ANOTHER chassis. This creates an interface risk and means that the ongoing deployment of the vehicle is reliant on the dependence of the convertor as well as the chassis manufacturer. Before offering this vehicle and its maintenance the supplier would need to have confidence that they are dealing with an organisation with the technical and financial resources necessary to support immediate parts and warranty requirements and the development of the product if any issues arise during its lifetime.

2.28 Compact sweepers are 250% more expensive than their diesel equivalent and leasing them for 2 x 3.5-year periods is uneconomical.

2.29 The key factor to consider when seeking to improve its fleet are emissions (the most widely accepted measure of environmental impact) and alternatives to diesel and petrol require investment in vehicles, infrastructure and adapted operational practices and daily processes. Even if suitable vehicle technology is mature and cost-effective, without adapted infrastructure and accepted methods of working, operations will stop if all three areas are not appropriately aligned. Consequently, fleet strategies must be coherent, resilient, and long-term to enable all stakeholders to unite behind them and support their implementation.

Infrastructure constraints

2.30 If Battery Electric Vehicles (BEVs) are the future for refuse fleets, the most notable market developments in the next few years will be how batteries will be configured and energy delivered to them. If hydrogen fuel cell technology develops, the outcome is that on-board stored hydrogen will be used to create power to charge batteries in situ and simply reduce the number of batteries on the vehicle, whilst retaining the same drivetrain. If hydrogen fuel cell development is slower than anticipated, then vehicles will still need to either be plugged into the mains supply, containerised battery banks, or will rely on

induction charging in the same manner as electric toothbrushes, whereby vehicles will park over surface mounted induction chargers.

2.31 Currently the fleet is deployed from the Whitehouse depot and any vehicle charging requirements need to be met on the site. With a high concentration of vehicles seeking power in a similar timescale (due to the nature of the shift patterns) peak demand is likely to be significantly higher mid-afternoon onwards than it is during operational hours. We have engaged an electrical supplier to advise on Network Installation and Containerised Battery Storage costs. If the ambition of the Council is to adopt a high number of BEVs in this fleet replacement cycle it should be noted that this process would result in a requirement to defer the replacement of the fleet for a minimum of six months to allow this exercise to occur. This delay would require a fresh procurement exercise to be undertaken as prices would not be held for more than 60 days after tender submission.

2.32 If we need to look at options for charging a greater number of BEVs this would require an upgrade to Three Phase 400 Amp supply, with an estimated cost of approx. £40,000. The electrician has approached Scottish and Southern for an estimate of the upgrade, however due to a high number of requests for this service, Scottish and Southern are not responding to our requests for information and it may be that the upgrade part of the cost could run into £200,000 plus. This is an estimated costs based a quote received for a much smaller upgrade to the nursery site four years ago which then was estimated at £50,000.

2.33 If Spelthorne were considering moving to BEVs with a select proportion of the current refuse and recycling fleet, **(Appendix 2, Option 3 provides an example of estimated costs),** then the challenges would not be so complex and a lower key approach to infrastructure development could be deployed. For these units, a commercial fleet “fast” (DC) charger would need to be purchased, supplied, and installed which would allow optimised charging outside of general working hours.

2.34 If a select proportion of vehicles were moved to eRCVs estimated costs based on an existing Three-Phase 200 Amp supply with alterations to the mains in the workshop for the new chargers would be approx. £30,000. This installation can be managed within a couple of months as it does not require input form Scottish & Southern.

2.35 It is an option to increase the number of BEVs on the fleet, but each additional BEV added carries its risks, delays and subsequent financial implications.

2.36 Options two and three below would benefit from Smart charging infrastructure which can balance out loads across all the chargers, switching loads as equipment reaches full charge, with balancing of the charging rates, to give batteries balanced, slower charges, to extend battery life and maximise charging capacity. The extra cost for this is approx. £15,000.

Pros & Cons of eRCVs

Pros	**Cons**
Cheaper to maintain, the electric powertrain has fewer moving parts than a diesel engine	Battery range, whilst this is improving there remains concern that the wear and tear on batteries will affect working time, potential

	creating service issues. Over time it is anticipated that battery technology will evolve and driving range improved
Kinder to the planet, BEVs produce zero tailpipe emissions, improving air quality and reducing CO2 and NOx emissions	Charging challenges. A full charge for an eRCV from 15% to 100% can be achieved in about 15 hours. Power outages for any reason will prevent vehicles from charging
Positive PR which generates a positive look on the Council and its declaration of a climate change emergency	High initial Capital outlay, it is anticipated that as BEVs become more popular these Capital costs will reduce and become more competitive
Easy to drive, no gears just stop/ start which makes them ideal for waste collection rounds	Reduced payload, the payload of commercial BEVs is reduced due to the weight of the batteries, vehicle range can also be affected when used in cold weather or driven aggressively.
With the growing urgency to tackle climate change and the introduction of clean air zones, electric vehicles are a way of future proofing and lowering business risk	Whilst renewable energy is increasing much of the energy that charges electric vehicles still comes from gas, coal, and nuclear power stations.
A graduated approach to the introduction of eRCVs at Spelthorne will help us to work towards the governments ban on non-zero emissions vehicles in 2040	Depreciation, as a fairly new technology there is not too much known about BEVs and how they depreciate.

2.37 All the options listed have taken the Government's proposals for a new Resources and Waste Strategy for England into consideration and this fleet of vehicles will be able to easily adapt to changing needs.

3. Options analysis and proposal

3.1 When making decisions on the final mix of vehicles the key options to be considered are based on the outcome of the tender process, vehicle availability, delivery timescales, infrastructure, and the financial constraints around opting for BEVs.

3.2 Four options have been provided in **Appendix 2** but this can be changed to reflect member decisions. However, when decision making the following points must be taken into consideration.

- The additional costs of purchasing/leasing BEVs over Internal combustion engines (ICE) and the ongoing financial commitments for the Council over the next seven years.
- The charging infrastructure, whilst we believe we can accommodate two electric RCVs without a completely new upgraded 400Amp supply

into the depot as more vehicles are added the risk of power and service failure increases.

- As technology and the introduction of more BEVs increases prices will become more competitive.
- Battery technology is improving, and Lithium batteries will be put to greater use in BEVs in the coming years, improving drive time and payloads.

3.3 **Appendix 2** contains four options along with associated costs

4. Financial implications

4.1 The additional revenue implications for all associated options are detailed within **Appendix 2.**

4.2 The International Financial Reporting Standard on assets has recently changed and the finance team will take this into account by bringing the leases into the Council's balance sheet.

5. Risk considerations

5.1 The current fleet of waste and cleansing vehicles, both leased and purchased, are due for replacement in mid-2023 when the current contract expires as vehicles come to the end of their reasonable working life and before we enter a period in which we have the potential to have to manage the increasing risk of vehicle and subsequently service failure. If this procurement exercise is not completed as set out in the timetable, key dates will not be met, and it is likely that the tendered prices will no longer be valid as manufacturers prices are only held for a specific period, usually 60 days when the markets are so volatile.

5.2 It is also a risk that if we do not take a graduated approach to the introduction of BEV vehicles into the fleet, we run the risk of investing in a market that is rapidly changing and may at some point divert to other technologies which could potentially be Hydrogen and/or much improved options for BEVs.

6. Legal considerations

(a) This procurement process was based on a further competition exercise of the Yorkshire Purchasing Organisations Fleet Managed Framework (921) Lot 3 Fleet and managed workshops. The framework had six service providers who were appointed to the Framework following a competitive tender process, compliant with PCR 20215. The Framework commenced in January 2019 for a period of four years.

(b) Fleet Managed Framework (960) Lot 1 Specialist Vehicles. This framework has several service providers who have been appointed following a competitive tender process, compliant with PCR 2015. The Framework commenced on 5 October 2019 for a period of four years.

The award criteria for the framework are set out below. Due to the estimated value of the Councils call-off contract the weighting for sustainability/social value was adjusted to meet our expectations.

Criteria	**Spelthorne weighting**
Cost	40%

Quality	30%
Delivery & customer service	20%
Sustainability/social value	10%

7. Other considerations

7.1 If members decide not to agree with one of the four options, the tender exercise will need to start again later, and we run the risk of vehicle and service failure due to the age of the vehicles along with ever increasing costs.

8. Equality and Diversity

8.1 Our waste collection services are designed to ensure that all residents can participate in all services offered. This formed the key part of a major service change in 2007 when we moved to an alternate weekly wheelie bin collection service. This procurement exercise will not adversely impact any of our residents or reduce the levels of service we offer.

9. Sustainability/Climate Change Implications

9.1 Options two and three support sustainability and will be aligned to the Council's climate change strategy, due to the reduction of carbon emissions from the zero emission electric vehicles.

10. Timetable for implementation

10.1 If members decide to award contracts to suppliers who have provided the most economically efficient tenders, the timetable is as follows: -

Corporate Policy and Resources 10 October 2022

Full Council 20 October 2022

Decision letters published w/c 24 October 2022

Contract award w/c 31 October 2022

Standstill period 10 days

Mobilisation and delivery of vehicles from June 2023 through to March 2024, subject to vehicle availability

11. Contact

11.1 Jackie Taylor Group Head of Neighbourhood Services

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Background papers: There are none.

Appendices:
Appendix 1 Examples of tender returns
Appendix 2 Options analysis and proposals