Environment and Sustainability Panel

Item **10**

21st March 2024

Report of	**Head of Neighbourhood Services**	**Author**	**Robert Doran 01206 282612**
Title	**Colchester City Council Fleet Transition Strategy**		
Wards affected	**All wards**		

1. Executive Summary

1.1 This report is presented in response to proposals and questions asked by the Environment & Sustainability Panel at its meeting of February 2024. It sets out to address questions and points of concern, in order to give confidence to the Panel to take forward the recommended decision. Topics include: the recycling and reuse of batteries, emissions from manufacturing, the point needed for investment in infrastructure, and cost comparisons of different fuel types.

2. Recommended Decision

2.1 Further to a discussion on the additional information provided, make recommendations to Cabinet to implement the Strategy with or without changes as agreed by the Panel.

3. Reason for Recommended Decision

3.1 One of the key priorities of the Strategic Plan for 2023 – 2026 is “responding to the climate emergency” and “delivering modern services for a modern city”. A key element is to reduce the carbon footprint and to remain on track for the Council to be net zero by 2030. The Strategy will enable the Council to make an informed decision on the investment in its fleet.

4. Alternative Options

4.1 Options are set out within the Colchester City Council Fleet Transition Strategy that consider the commitment to transition the fleet to fully electric vehicles, the use of Hydrotreated Vegetable Oil (HVO) as a drop in fuel or continuing with the replacement of vehicles with the latest Euro engine diesel vehicles.

5. Background Information

5.1 The Environment and Sustainability Panel at their meeting of February 2024 were presented with proposals for a new Fleet Transition Plan. Numerous questions were posed to Officers, and this report aims to address these points, with the aim to provide confidence to the Panel that they can make the recommended decision as set out.

Question: An explanation of the 'tipping point' beyond which our used of electric vehicles would require us to install a sub-station at Shrub End

5.2 The Energy Savings Trust in July 2020 prepared a report (Appendix A) for Colchester City Council to assess the efficiency of its fleet in terms of greenhouse gas emissions, energy consumption and operating costs. Within this report, it sets out that the Council would need a 526kVA[1] supply at the Shrub End depot to service an all-electric fleet. Using the model within the report it determined the capacity required from four possible charging strategies:

1. The first is the capacity required for all the chargers to operate simultaneously at full power – this is the simplest option, and many vehicles will be fully charged in less than eight hours leaving unused capacity throughout the rest of evening.

2. The second strategy considered assumes that all the vehicles return with 10% battery capacity and there is a charge management system in place to spread charging over the whole overnight period by restricting the capacity available to the chargers.

3. The third strategy uses the tracking data, considers the mileage driven by the vehicles during the day and determines the electricity (kWh) required to return the vehicles to a fully charged state.

4. The fourth and final strategy is much riskier. It allows the vehicle to run down throughout the week by ensuring that each vehicle has enough power to complete the next day's workload and is only fully recharged over the weekend. This final strategy only works with a very predictable daily workload and does not accommodate changes made at short notice. It is a high-risk strategy and should only be considered if the site capacity is severely constrained, upgrade is very expensive, and the vehicles have a very predictable work pattern.

Table 1: Site capacity required by different charging strategies

Strategy	Description	kW	Notes
1	Simple maximum capacity – all 100% charged	1,040	Very expensive
2	Smart - worst case – all 100% charged	533	Expensive as over 400 kVA
3	**All departures 100% charged**	498	**Optimal**
4	No unnecessary off-site charging, not all 100%.	351	High risk

5.3 It may be difficult to create the 500kW of headroom predicted to be needed to fully charge the electric Refuse Collection Vehicles (eRCVs) overnight. It is believed that this

[1] kVA – kilo volt-amperes. A unit of apparent power, which is the product of Root Mean Square (RMS) values of voltage and current (i.e. the amount of power being used by a system).
KW – actual power

may be a worse case estimate but only a long-term detailed on-site evaluation of an eRCV across all the Council's routes will determine that.

Question: Explanation about the whole life cycle of batteries and vehicles

5.4 In recent years, motor vehicle manufacturers, have shown a vested interest in distancing themselves from any involvement in illegal or unsustainable methods of vehicle manufacture. While past allegations suggested the use of child labour for electric vehicle battery production, it is apparent that production methods have since evolved, with rare trace minerals and materials now being responsibly sourced from various global locations. Notably, graphite extraction for battery production has recently been licensed in Canada, with minerals also being extracted from Australia and Chile, among other regions.

5.5 Insights from a report by Forbes in 2022 underscored the longevity of electric car batteries, with UK Marketing Director for Nissan, Nic Thomas, noting that the vast majority of electric car batteries produced by Nissan over the past twelve years remain in active use, delaying recycling programs.

5.6 At the end-of-life stage for electric vehicles, batteries are being repurposed for electricity storage or recycled, with raw materials such as lithium and nickel being reclaimed for use in new battery production. Advances in battery technology, particularly in battery management systems and cooling mechanisms, have led to substantial improvements in efficiency and cost-effectiveness without added weight or expense. These enhancements, such as the adoption of liquid cooling systems, suggest a potential lifespan of over twenty years for modern batteries.

5.7 Moreover, efforts to address the approximately one million electric vehicles already on UK roads are underway. Nottingham City Council (NCC) for example, has explored various strategies, including battery repair, reuse, and replacement. Utilising battery refurbishment tools, NCC has successfully restored older batteries to nearly double their original range. Additionally, containers filled with batteries reclaimed from vehicles at the end of their lifespan are being repurposed for alternative energy storage purposes. Collaborating with a Scottish company, NCC is also investigating innovative methods for replacing outdated batteries with newer, technologically advanced alternatives, potentially extending the lifespan of electric vehicles beyond their original specifications.

Question: Check the current cost of HVO and diesel and cost per mile for fuel types

5.8 Table 2 illustrates the pence-per-mile (PPM) cost of a 26-tonne Refuse Collection vehicle achieving 4 miles per gallon, based on the Council's figures for diesel and electricity. The report from Energy Savings Trust July 2020 report (Appendix A), reported that Colchester City Council's waste fleet averaged 3.4mpg, with a 2.0 – 4.7 mpg range.

Table 2: fuel cost comparisons

Fuel / energy	Unit	Price uplift for HVO	Price (excl VAT)	Fuel consumption (mpg)	Battery Electric Vehcile kWh per mile	Price per mile
Diesel (average biofuel blend)	litre	n/a	£1.25	4.0	n/a	**£0.31**
Biodiesel HVO	litre	25%	£1.56	4.0	n/a	**£0.39**

Electricity	kWh	n/a	£0.23	n/a	3.13	**£0.72**

Questions: Provide more detail in the Equality Impact Assessment in relation to the Council's procurement social value indicators

5.9 The Council is committed to ensuring equality in its procurement processes. As part of this commitment. The Social Value Portal is utilised for relevant contracts, enabling bidders to propose targets that align with the Colchester Themes, Outcomes, and Measures (TOMs) framework. This framework is a comprehensive set of measures designed to assess the social value of a contract.

5.10 The Social Value Portal is an online platform that facilitates the integration of social value into the procurement process. Bidders interested in participating in the Council's projects are required to register on the Social Value Portal. Detailed guidance on how to navigate the portal and how to align bids with the Colchester TOMs framework is provided in the tender pack for each project.

5.11 Once a bidder is successful, their social value offer becomes an integral part of the contract. This means that the commitments they have made regarding social value are contractually binding. The Social Value Portal plays a crucial role in this stage as well. It provides a robust monitoring system that tracks the successful bidder's performance against their social value commitments throughout the contract's duration.

Question: Are we aware of the emissions associated with generating/procuring both Hydrotreated Vegetable Oil (HVO) and electricity consumed by the fleet

5.12 From the Digest of UK Energy Statistics (DUKES) 2022 produced by the Department for Business, Energy & Industrial Strategy, renewables accounted for 135/325 terawatt-hours (TWh[2]) (42%) of total UK electricity generation, fossil fuels accounted for 133/325 TWh (41%) and the remaining 17% came from nuclear production, or was imported from Europe (usually France, Eire, Belgium and Netherlands).

5.13 Powering the battery electric version of a fossil-fuelled vehicle will see a 75-80% reduction in greenhouse gases and powering it by HVO will see a 90% greenhouse gas reduction but see Section 5. 'Alternative Fuels' in the Fleet Transition Plan (pages 15 and 16).

Question: How many miles is it anticipated that each vehicle would do?

5.14 Vehicle use varies over time. Table 3, sets out the average annual mileage for the Recycling Collection Vehicles in the Council's fleet portfolio:

Table 3: Average annual mileage

Openback	11,728
Trade lift	13,101
Twin lift	8,814
Triple lift	8,265
50/50	6,179

6. Equality, Diversity and Human Rights implications

[2] The amount of electricity generated from renewable sources over a certain period

6.1 There are no further updates to the equality diversity and human rights implications from the report of the Environment & Sustainability Panel of February 2024.

7. Strategic Plan References

7.1 There are no further updates to the strategic plan references from the report of the Environment & Sustainability Panel of February 2024.

8. Consultation

8.1 There are no further updates to the approach to consultation from the report of the Environment & Sustainability Panel of February 2024

9. Publicity Considerations

9.1 There are no further updates to the publicity considerations from the report of the Environment & Sustainability Panel of February 2024

10. Financial implications

10.1 There are no further updates to the financial implications from the report of the Environment & Sustainability Panel of February 2024

11. Health, Wellbeing and Community Safety Implications

11.1 There are no further updates to the health, wellbeing and community safety implications from the report of the Environment & Sustainability Panel of February 2024

12. Health and Safety Implications

12.1 There are no further updates to the health and safety implications from the report of the Environment & Sustainability Panel of February 2024

13. Risk Management Implications

13.1 There are no further updates to the risk management implications from the report of the Environment & Sustainability Panel of February 2024

14. Environmental and Sustainability Implications

14.1 There are no further updates to the environment and sustainability implications from the report of the Environment & Sustainability Panel of February 2024

Appendix A
Energy Savings Trust Report – July 2020