**BABERGH DISTRICT COUNCIL**

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| **TO:** | **Cabinet** | **REPORT NUMBER: BCa/20/22** |
| **FROM:** | **Councillor Elisabeth Malvisi - Cabinet Member for Environment** | **DATE OF MEETING: 7 January 2021** |
| **OFFICER:** | **Cassandra Clements - Assistant Director for Environment & Commercial Partnerships** | **KEY DECISION REF NO. CAB219** |

# TRANSFER OF THE COUNCIL'S VEHICLE FLEET TO HYDROTREATED VEGETABLE OIL (HVO) DIESEL

## 1. PURPOSE OF REPORT

1.1 To provide detailed information of the costs and $CO_2$ reductions in relation to the transferring of the council's vehicle fleet over to HVO, renewable diesel fuel.

## 2. OPTIONS CONSIDERED

2.1 Other alternatives to de-carbonise the vehicle fleet were researched; electric, biodiesel, and HVO were considered

2.2 **Electric**
There is one model of electric RCV commercially available, the eCollect manufactured by Dennis Eagle. The costs of the vehicle are 40-80% greater than a conventional diesel engine version. However, electric costs to power the vehicle are about a third of diesel with additional savings in the form of zero vehicle tax and reduced servicing costs. There would be additional costs in the form of suitable electric vehicle charging points and associated infrastructure at depots.

2.3 There are no appropriate technical performance details of the electric vehicles available from Dennis Eagle. There are trials occurring across the country, notably the City of London, however, these are predominantly in urban areas. A trial of an electric vehicle has been requested from Dennis Eagle.

2.4 Due to the lack of performance data for the electric RCVs there would be many risks associated with moving over to electric RCVs immediately. A large proportion of the RCV fleet comes to the end of their current lease in 2023. A consideration may be to review this exercise again before that date by which time there should be more data available to make an informed decision.

2.5 **Biodiesel**
Biodiesel otherwise known as Fatty Acid Methyl Ester (FAME) is a diesel fuel replacement produced from plant and vegetable oils. Such oils cannot be blended directly with conventional diesel and so a chemical reaction using methanol and sodium hydroxide as a catalyst is used to convert vegetable/plant oils into their constituent methyl esters. These can then be blended with diesel at levels of up to 10%. However, the standard norm in the UK is to blend biofuels to a maximum of 7% of the total fuel.

2.6 Plant/vegetable oils may come from a variety of sources, such as oilseed rape, soy, palm, used cooking oils (UCO) and waste oils. Depending on the provenance, the biofuel can save around 50-60% of the emissions resulting from a ULS (ultra-low sulphur) diesel fuel. However, they do have their own unique other issues.

- Palm oil-based fuels block the vehicle's filters.
- Biodiesel can also oxidise if left too long in a storage tank and it goes rancid.
- Biodiesel have a corrosive effect on vehicle engine's rubber components.
- Doubt over the traceability of the UCO sourced from outside Europe.
- The main issue is the likelihood that biodiesel contains palm oil, even if from a waste cooking oil source. Whilst it offers a cheap and versatile feedstock the environmental and ecological impact related to its cultivation has increasingly brought the sustainability and long-term suitability into question.

2.7 Therefore, for the above reasons, biodiesel in this form has not been considered as a suitable alternative fuel in this report

2.8 **Hydrotreated Vegetable Oil (HVO)**
HVO is an alternative way to produce high-quality biobased diesel fuels without compromising fuel storage, engines, exhaust aftertreatment devices, or exhaust emissions. These fuels are colloquially referred to as "renewable diesel fuels" instead of "biodiesel". Chemically HVOs are mixtures of fully saturated hydrocarbons and are free of sulphur and aromatics, unlike fossil diesel. Cold properties of HVO can be adjusted to meet the local requirements by adjusting the severity of the process or by additional catalytic processing. This is therefore the recommended option.

**3. RECOMMENDATIONS**

3.1 Move to using HVO as a replacement for conventional diesel in the Council vehicle fleet. This is a cleaner, less polluting fuel and results in a significant $CO_2$ emission reduction.

3.2 To proceed with the procurement of a supplier for the provision of HVO fuel and the supply and installation of a fuel tank at Chilton Depot, Sudbury.

3.3 To secure the capital and revenue budgets funding for the project for a minimum of 3 years as identified in the report.

3.4 To proceed with a CIL bid to fund the capital element of the project.

**REASON FOR DECISION**

3.5 **To reduce the councils $CO_2$ emissions by 900 tonnes a year. This represents 26% of total the total emissions. In accordance with its commitment to be zero carbon by 2030.**

## 4. KEY INFORMATION

4.1 Carbon ($CO_2$) emissions from the combined Councils' fleet of vehicles represent 26% of the organisations total $CO_2$ emissions, approximately 900 tonnes in total. It is the 2nd largest emitter after Leisure Centres.

4.2 The waste fleet represents the largest proportion of 645 tonnes , the Public Realm Fleet 150 tonnes and Housing 105 tonnes.

4.3 Currently the Waste (Serco) , Housing fleets and Public Realm (ID Verde) use fuel cards at Petrol Stations for refuelling.

4.4 The arrangements for HVO fuel would need 50,000l fuel tanks located at Chilton Depot , Sudbury and Creeting Road Depot , Stowmarket and operated via a key fob system. The cost of the fuel tanks is approximately £50,000 each.

4.5 Delivery and installation of the fuel tanks is 12-14 weeks from award of the contract. Potentially the project could go live April / May 2021.

4.6 For the purposes of research two local energy and fuel consultancy organisations, Michel Foley Associates and Staines and Goulding who have experience in the biodiesel and HVO markets were interviewed. From these discussions contact was made with Neste, a Finnish based oil refining company who are the world's major manufacturers of HVO.

4.7 Discussions and market research have also been carried out with our Waste Collection Partner Serco PLC.

4.8 HVO is a paraffinic fuel that is chemically similar to conventional fossil fuel diesel and complies with European Standard EN1590. It is also a renewable energy source, produced from 100% sustainable renewable waste feedstocks coming from waste cooking oil, residues etc, - reducing greenhouse emissions by up to 90%* and delivering significant reductions in tailpipe emissions, https://www.lowcvp.org.uk/assets/reports/RenewableFuelsGuide_March2020.pdf

4.9 HVO lowers overall life cycle greenhouse gas emissions by up to 90% depending on the blend, with most of the emissions reduction coming from the uptake of $CO_2$ from the atmosphere. There is currently no independent data for HVO $CO_2$ emissions therefore the DEFRA conversion factors for biodiesel have to be used.

4.10 Compared to conventional diesel, it has a higher energy per content yield than petroleum-based diesels, better cold-flow properties to work in colder climates and less maintenance required. In addition, HVO can be introduced into Euro 6 diesel engine without any mechanical modifications, at any ratio with petroleum-based diesels. They are therefore labelled "drop in fuels".

4.11 Whilst HVO provides excellent technical properties, it can have a major drawback in that the oil of choice for HVO is typically Palm Oil. However, discussions with the producer, Neste, has identified that their HVO can be specified without any Palm Oil. They are certificated by the ISCC, International Sustainability and Carbon Certification, who produce Proof of Sustainability (POS) Certificates for the product from their refineries.

A due diligence check on the ISCC website identifies valid POS certificates that are independently audited, and they confirm that no Palm Oil is included. This pre-requisite can be built into any procurement specification.

4.12 The EU Renewable Energy Directive (RED ii) aims to ban all Palm Oil in biofuels in stages by 2030. This gives confidence in the security of supply of HVO without Palm Oil content going forward. Palm Oil being omitted does not affect the price.

4.13 Discussions have been held with key fuel suppliers. There is near limitless quantities of the base feedstock i.e. the used cooking oil, however it has been the processing plants that are needed to convert it to HVO that has limited production. To cope with this and satisfy the large European Market, traditional oil refineries have been converted to HVO production and this has led to the increase of more than 40% capacity in the last five years. This situation will continue to satisfy the ongoing demand.

4.14 In the event of any disruption to supply of HVO the vehicles would revert to using fossil diesel so there is no risk to operational services.

4.15 The London Borough of Hackney is transferring its fleet of 470 vehicles over to HVO fuel including its Waste Fleet (see below Case Study Appendix B)

## 5. LINKS TO CORPORATE PLAN

5.1 The 2018/19 Greenhouse Gas (GHG) emission report for BMS identified that the Refuse and Recycling vehicle fleet is responsible for over a quarter of the Councils' GHG emissions.

5.2 The Councils declared a Climate Emergency in 2019 and the Cabinet's Carbon Reduction Management Plan was recently published. Proposal 4.3 of the Plan states:

- We will secure the transition of appropriate Council fleet vehicles to electric or other zero carbon fuel sources such as Hydrotreated Vegetable Oil, HVO. Produce a feasibility study including a costed proposal, for using low carbon fuel in the Refuse Collection fleet in place of diesel (as an interim measure prior to full replacement with electric or renewable fuel vehicles). All Euro 6 standard vehicles have the ability to use alternative fuel without the need to retrofit.

## 6. FINANCIAL IMPLICATIONS

| Revenue/Capital/ Expenditure/Income Item | Total | **Year 1 2021/22** | **Year 2 2022/23** | **Year 3 2023/24** |
|---|---|---|---|---|
| Capital – Supply and Installation of 50,000l fuel tank | | £50,000 | | |
| Smallest cost differential – HVO Fuel £0.15 | 381,070 l | £57,000 | £57,000 | £57,000 |
| Net Effect | | £117,000 | £57,000 | £57,000 |

| Revenue/Capital/ Expenditure/Income Item | Total | **Year 1 2021/22** | **Year 2 2022/23** | **Year 3 2023/24** |
|---|---|---|---|---|
| Capital – Supply and Installation of 50,000l fuel tank | | £50,000 | | |
| Greatest cost differential – HVO Fuel £0.26 | 381,070 l | £99,078 | £99,078 | £99,078 |
| Net Effect | | £148,800 | £98,000 | £98,800 |

6.1 The Fuel Tank Capital element of the funding could be supported via CIL , Waste Infrastructure falls within the scope of CIL funding.

6.2 Fossil Diesel and HVO prices are subject to constant variation and the cost differential is not a certainty.

6.3 Our research shows that over the last 3 years the differential has varied between £0.15 - £0.26 per litre. The tables above show the impact of the extremes of the variances between HVO diesel and conventional diesel.

6.4 An annual revenue budget of £100,000 (£12,000 HRA and £88,000 General Fund) would be needed to cover the highest end of the cost difference.

6.5 The price of HVO is not tied to the price of conventional diesel but there are supply chain factors that can influence the cost. Part of any procurement specification would be trying to set the cost over the course of the supply contract or if not possible fix as much cost certainty as possible.

6.6 From discussions with the fuel supply industry they seemed confident that the cost of HVO will continue to reduce until it reaches parity with conventional diesel. This is mainly due to the importance that the UK Government is applying to low carbon fuels and the renewable fuel obligation buy out price.

6.7 This is a high cost but high Carbon Impact Saving. However, it is an easier option to implement than many of the other Carbon Impact Saving proposals.

6.8 If the change to alternative fuels doesn’t go ahead then deeper Carbon Impact Savings and potentially even higher costs to achieve them will have to be made within other areas of the Councils to enable their aspiration of being Zero Carbon by 2030.

6.9 There is an interdependency with Mid Suffolk District Council on this decision. Currently the Waste Fleet are used by Serco in a contract covering an overall geographical area.

The Public Realm Team will also be a joint team from October 2021. It would be impossible in these areas for one Council to move to HVO and not the other. This leaves only Housing where it could be implemented on a single District basis.

## 7. LEGAL IMPLICATIONS

7.1 There are no wider legal implications to this decision.

## 8. RISK MANAGEMENT

8.1 Key risks are set out below:

| Risk Description | Likelihood | Impact | Mitigation Measures |
|---|---|---|---|
| Financial Certainty – variance of cost (£57,000 - £100,000) | 3 | 2 | A procurement and subsequent contract could give a longer-term cost certainty. Set revenue budget at the higher end |
| Security of supply | 2 | 2 | The EU Renewable Energy Directive (RED ii) aims to ban all palm oil in biofuels in stages by 2030. As a result, manufacturers are ramping up their non-palm oil sources. This gives confidence in the security of supply of HVO without Palm Oil content going forward<br><br>The fall-back position is that the vehicles can revert to conventional diesel at any time. The storage tanks would have to be flushed through before HVO is used again. |

## 9. CONSULTATIONS

9.1 No consultations have taken place for this report.

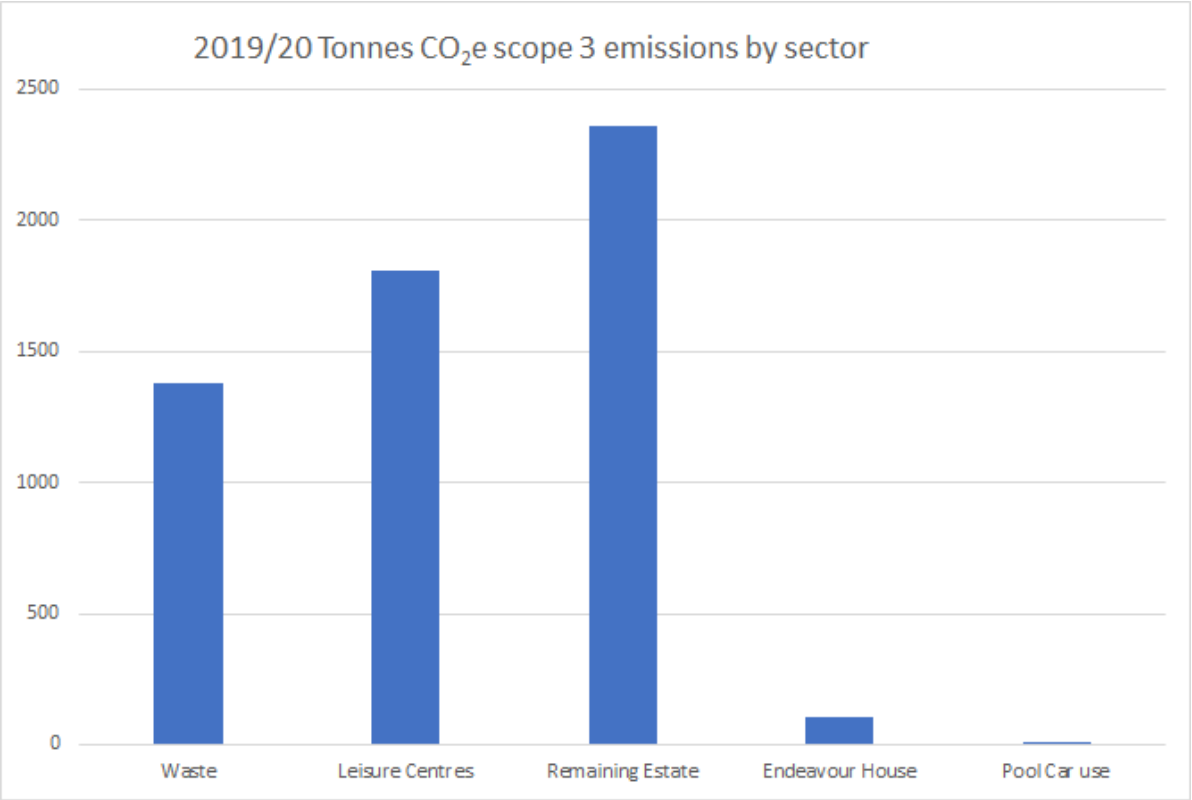
## 10. EQUALITY ANALYSIS

10.1 Equality Impact Assessment (EIA) not required.

## 11. ENVIRONMENTAL IMPLICATIONS

11.1 The bar chart below is from the Green House Gas Emissions Report for 2019/20 for Scope 3 Emissions, i.e. those produced through the use of fossil fuels by outsourced services, in this case SERCO for the combined waste collection service for Babergh and Mid Suffolk District Councils.

The Waste Service emissions are the second largest single emitter after Leisure Centres. The remaining estate includes all the emissions from relatively small sources such as touch down points, offices, public toilets, car park lighting, sewage treatment works etc.




11.2 HVO fuel gives up to 90% reduction in greenhouse emissions, significantly better for the environment than regular diesel or biodiesel

It is also a renewable energy source, produced from 100% sustainable renewable waste feedstocks coming from waste cooking oil, residues etc. eliminating up to 90% of greenhouse gas emissions and reducing NOx, PM, and CO emissions in addition to recycling food waste.

11.3 Typical values in the reduction of other pollutants compared with fossil fuel diesel:

< 1ppm Sulphur compared to diesel at >10 ppm
0% polyaromatic hydrocarbons compared to 11%
-10% NOx emissions
-30% particulate matter
-25% Carbon monoxide

## 12. APPENDICES

| Title | Location |
|---|---|
| (a) Case Studies | Attached |

## 13. BACKGROUND DOCUMENTS

13.1 AMF Paraffinic Diesels General June 2020

Brakes GTL DAF Trial Results August 2018

NNFCC Norse Decarbonising Transport to Improve Fleet Sustainability March 2020

Neste POS 20180715 Stolt Greenshank Prax 10263130D0000002[3][1] July 2017

## 14. REPORT AUTHORS

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## Appendix A – Case Studies

**Case Study: London Borough of Hackney (**Renewable Fuels Guide prepared by Low Carbon Vehicle Partnership and CENEX March 2020)

At just over 470 vehicles, London Borough of Hackney (LBH) operates one of the largest local authority fleets in London of which approximately 270 are light commercial vehicles supplied by a range of manufacturers. It also operates a fleet of HDVs including Dennis Eagle refuse collection vehicles.

LBH aims for all of its commercial vehicles to be ultra-low emission vehicles (ULEVs) by 2028. Ideally this will be achieved by using electric vehicles which have zero tailpipe emissions. However, current vehicle technology does not currently support this vision, particularly for the heavier vehicles, so LBH is using renewable fuels to minimise its emissions.

LBH used FAME biodiesel in blends of up to 100% for several years, saving significant quantities of CO2 More recently, it has trialled and deployed HVO across its commercial vehicle fleet.

Green Biofuels Ltd supplied HVO produced by Neste in Finland and the Netherlands, the company is RTFO approved. Neste's fuel is produced from waste and residue fat fractions from food, fish and slaughterhouse industries, and from non-food grade vegetable oil fractions. Their HVO supply chain is ISCC certified.

LBH uses an on-site fuel management system to monitor and analyse fuel consumption and mileage data. This means they can calculate their carbon footprint on an individual basis. Analysis undertaken by LBH has found that this fuel offers well-to-wheel CO2 emissions savings of 80% compared to conventional diesel.

The fuel has performed well from an operational point of view. HVO requires no additional maintenance or changes to operational procedure as it is used as a direct replacement for conventional diesel so there is no price differential for the vehicles themselves.

The fuel costs more per litre than mineral diesel so there is no whole life cost saving however, it represents a cost-effective option for reducing fleet carbon emissions.

LBH sources its suppliers through the public sector tendering process and can use this to encourage use of low emission vehicles, though it currently does not mandate use of HVO or other specific fuels or technologies.

The organisation is currently re-tendering its bulk fuels contract to make HVO its primary road fuel for all vehicles above 3.5t GVW. LBH is considered a leader among public sector fleets and encourages other local authorities and organisations in London to follow its lead and deploy renewable fuels to cut transport emissions.