Cherwell District Council

Executive

6 November 2017

Fleet and Vehicle Replacement Strategy

Report of Head of Environmental Services

This report is public

Purpose of report

To update the Executive on the operation of the Council vehicle fleet and to consider a vehicle replacement strategy to reduce whole life costs, develop income and minimise environmental impact through the introduction of telematics to reduce fuel usage and a move away from a purely diesel powered vehicle fleet.

1.0 Recommendations

The Executive is recommended to:

1.1 To approve the Fleet and Vehicle Replacement Strategy as attached at Appendix 1.

1.2 To support the introduction of telematics to reduce fuel usage.

1.3 To support the move away from a purely diesel powered vehicle fleet.

2.0 Introduction

2.1 The vehicle fleet is critical to the delivery of many of the front line services of the Council. To operate the fleet, there are many considerations such as legal compliance, quality, cost and environmental impact. These matters were part of the Council's shared service consideration and the decision to purchase vehicles rather than lease.

2.2 The Council's fleet consists of over 70 vehicles performing a wide range of tasks including refuse and recycling collections, bulky waste collections, emptying glass banks, mechanical sweeping, emptying of litter bins, removal of fly tips, delivery of bins, election logistic delivery work and operational supervisor transport.

2.3 The Council's fleet operates within an Operating Licence (O licence) monitored by the Driver Vehicle Standards Agency (DVSA) and places a range of requirements including to have a competent professionally qualified person named on the O licence, vehicle inspection frequencies, vehicle maintenance record keeping and driver hour monitoring. The DVSA monitors fleet operators giving them a traffic light risk score. The fleet at Cherwell is green, considered low risk.

2.4 The vehicle fleet is critical for the delivery of frontline services. Ensuring the vehicles are correctly specified and fit for the purpose for intended use is crucial. In recent years advances in technology means that our refuse collection vehicles (RCVs) have features which include;

- On board weighing to ensure vehicle do not become overloaded
- Four way camera recording to help in accident/insurance claims and customer issues
- Bartec in-cab technology to provide property details including specific instructions relating to an individual properties and also tracks the vehicle
- Reversing cameras to assist with safe reversing

2.5 The capital cost of vehicles can be significant with a RCV costing in excess of £165k. However, the key measure on a vehicle is not just the initial capital cost but running costs including maintenance, fuel and end of life value. Overall, the fleet is looking for vehicles which are fit for purpose and deliver the lowest whole life cost.

2.6 A new piece of technology currently being evaluated is vehicle telematics. A number of features such as acceleration and braking can be measured and give the driver feedback on his overall environmental driving performance. Initial trials carried out on two vehicles show that the use of telematics deliver an 8% fuel saving. If this was replicated across all the RCV fleet the savings would be around 24,000 litres per year. This equates to a saving of £22 to 24k per year and a reduction of CO2 emissions by 64 tonnes per year.

2.7 The environmental impact from the fleet can be great. The overall fleet is responsible for around 25% of the Council's overall CO2 emissions. In recent years large vehicle technology and legal requirements have not significantly improved fuel consumption but has substantially reduced nitrogen dioxides (NOx) and particulate matters (PMs).

2.8 Over the last couple of years concerns about the environmental and human health impact of diesel engines on air quality have been raised. The growth in the use of diesel engines in cars has been blamed for air quality issues and has the potential to damage health.

2.9 While the emissions of nitrogen dioxides and particulates from large goods vehicles have improved as the engine standards have moved to Euro 6, this has not been the case for cars, small vehicles and car derived vans. This is because for these smaller vehicles the emissions produced in laboratory conditions and in real road driving conditions can be substantially different. For some cars which comply with the Euro 6 standard in laboratory conditions, in real road conditions they exceed the Euro 6 standard by up to ten times the limits.

2.10 The Council operates a number of car derived vans which are diesel powered. This has been largely because most car derived vans on the market are diesel powered and the depots stock diesel fuel only.

2.11 The intention is to further minimise the environmental impact of the fleet through the introduction of vehicle telematics thereby reducing fuel, reducing emissions and saving money. In addition it is proposed that for small car derived vans the Council

starts to move away from a purely diesel fleet to consider electric and other possible alternatives.

2.12 Other fleet management actions to protect the environment include the use of remoulded tyres. This not only has delivered financial savings but tyre casings with low tread levels are returned to the supplier to be remoulded so they can be reused.

2.13 As a proposed joint Fleet and Vehicle Replacement Strategy, this same matter will be considered by South Northamptonshire's Cabinet on 13 November 2017.

3.0 Report Details

Vehicle Costs

3.1 Each year the Council has a capital project to replace vehicles which have reached the end of their economic life. For financial purposes many of the vehicles, particularly RCVs in the Council fleet are financially written down over seven years. However, each individual vehicle reviewed in terms of condition and maintenance cost before a decision is made. Generally, although financially written down after seven years, many RCVs are operated for up to nine years. From 2018/19, the intention is to write down the vehicles over eight years rather than seven. This would reduce annual depreciation costs for a RCV by over £3k per vehicle per year.

3.2 On other vehicles, especially street cleansing vehicles, vehicle life is being extended by moving to plastic bodies. Typically, street cleansing vehicles have been of a size similar to Ford Transit type vehicles with a metal cage. The body & cage rust badly and by seven years the vehicle body is badly corroded. In recent years a plastic body has been used as this not only increases payload but should extend vehicle life towards ten years from the current seven years.

3.3 RCVs are costly to purchase and heavy on fuel and maintenance costs. A new vehicle costs around £165k to purchase. The total costs associated with running a waste collection crew are set out below.

	£'000
Annual Depreciation cost (7 year life)	24
Annual maintenance cost including tyres	16
Annual fuel cost	18
Annual crew cost including holiday cover	90
Annual road tax & insurance	10.5
Total annual cost	£158.5

3.4 The cost of running a crew and the environmental impact can be minimised by the following

- extending the life of the vehicle beyond seven years
- minimise maintenance cost through good maintenance practice and by the crew looking after the vehicle
- reduce fuel costs through efficient routes and driver behaviour

3.5 To minimise maintenance costs a number of actions have been taken which include using remoulded tyres. RCVs spend a lot of time running against the kerb while collecting. Hence it is not unusual for a tyre to be replaced not because of insufficient tread but due to sidewall damage from running against the kerb. The remoulded tyres used by the Council have extra thick sidewalls to minimise this problem and control tyre spend.

3.6 Fuel costs which form a significant part of the overall costs have been reduced through a combination of procurement, driver training and designing collection rounds so mileage is minimised. To further reduce fuel usage which will deliver not only a reduction in fuel cost but also emissions, vehicle telematics have been investigated.

3.7 Vehicle telematics systems link to the existing on-board computers which measure hundreds of the vehicle parameters. These parameters are monitored by the on board computer and can be connected to a telemetry system. The system in particular uses key parameters related to acceleration, engine revs, braking etc and gives a good indication on how economically and safely a driver is performing. The telemetry system provides instant feedback to the driver and in effect nudges the driver to drive more economically. In a recent trial on two vehicles over a month a fuel saving of more than 8% was achieved.

3.8 Such systems do have a running cost. For a fleet of twenty RCVs it is likely to be around £8k per year. However the fuel savings equate to £22-24k/year. There is a likely small one-off capital cost for Euro 6 RCVs of around £200 per vehicle. For older RCVs, Euro 5, the one off cost is around £800 per vehicle. However, by May 2018 three quarters of the RCV fleet will be Euro 6 vehicles. The intention is not to install telemetry on Euro 5 with an estimated life of less than two years but to install the telemetry once the vehicle has been replaced with a Euro 6 vehicle. The exact financial details and savings will become clearer once a procurement exercise is completed.

3.9 Other fuel savings ideas being investigated include night heaters on the refuse collection vehicles. This involves a specific heater being fitted which warms the cab and windows using a very small amount of fuel and avoids the need to start the engine just to warm up the cab. Using the engine on cold warms for this purpose uses 4 litres per hour compared to less than 0.1 litres per hour for a night heater.

Vehicle Emissions

3.10 Over several years, European regulation has looked at improving the emissions from vehicles. For Large Goods Vehicles (LGV) standards from Euro 1 to Euro 6 have been introduced. Euro 1 was introduced in 1992, Euro 2 followed and Euro 3 was introduced in 2000.The emissions standards for the various engines since Euro 3 are set out in the table below.

Engine type	Year of Introduction	Nitrogen dioxides NOx	Particulates PM
		(g/kwh)	(g/kwh)
Euro 3	2000	5.0	0.1
Euro 4	2005	3.5	0.02
Euro 5	2008	2.0	0.02

Euro 6	2013	0.4	0.01

3.11 The reduction in Nitrogen dioxides (NOx) between Euro 3 and Euro 5 was 60%. Similarly the reduction in Particulates (PM) was 80%. Euro 6 has reduced NOx by a further 80% compared to Euro 5 and PM by an additional 50%. Overall a modern LGV Euro 6 produces only 10% of the particulates and 8% of the Nitrogen dioxides of a Euro 3 back in 2000

3.12 All Council LGVs are either Euro 5 or Euro 6. The current plan will see the following changes in the coming few years

	Mar 2017	Mar 2018	Mar 2019	Mar 2020
Euro 6 LGVs	10	15	18	21
Euro 5 LGVs	17	12	9	7

3.13 The change to increasing the number of Euro 6 trucks will significantly reduce both nitrogen dioxide levels and particulates. The change to Euro 6 increased the average purchase price of a refuse collection vehicle as changes to the engines and exhaust systems are in excess of £10k per vehicle.

3.14 There have been similar changes for smaller vehicles. However, cars do not have the space to accommodate the changes in the engines which LGVs have had. Hence it may not be surprising that although Euro 6 small vans and cars may meet emissions standard levels in laboratory conditions, on the road in real driving conditions some cars and vans exceed standards by large margins of sometimes up to ten times.

3.15 A government funded report looking at diesel emissions from cars following the scandal relating to Volkswagen found that although no other manufacturer seemed to be using software to 'cheat' emissions standards, it did show many concerns relating to emissions from diesel cars. The main two concerns were that although emissions standards for cars tightened between Euro 3 and Euro 5, actual emissions showed no improvement. The other concern was that although Euro 6 emissions for cars are better than Euro 5 many models of cars in real driving conditions greatly exceed these standards.

3.16 The Council has 15 small car derived vans. Of these, one is electric and all the rest are diesel. The vans have been largely diesel because it is the predominant type of commercial vehicle and also because the Council holds stocks of diesel but no other fuel including petrol.

3.17 There are a number of air quality management areas in this Council area. All these areas breach air quality standards due to vehicle emissions. Poor air quality is a danger to human health and vehicles are a major contributor to poor air quality. The Council's LGVs have contributed to reduced emissions by the vehicle replacement plan.

3.18 Changes in vehicle technology have started to produce other possible fuel options. For LGVs, the current only viable option is diesel vehicles. However, for small car derived vans, options exist including petrol, LPG, electric & hydrogen.

3.19 **Petrol engines** - In recent years petrol engines have shown large reductions in emissions particularly carbon dioxide and nitrogen dioxides. The emission standard

for Euro 6 petrol is 25% below that of diesel. Studies seem to indicate that Euro 6 petrol engines meet emissions standards both in the laboratory and in real driving conditions. However, currently the range of petrol vans is narrow, carbon dioxide emissions are higher than diesel and a fuel card system would have to be introduced as no depots in Cherwell or South Northants hold petrol due to the requirements to store petrol.

3.20 **Liquid Propane Gas (LPG) -** LPG engines are becoming less common. The Council operated one vehicle which was LPG which was duel fuel in that petrol was required to start the engine before the engine switched to operating on LPG. Oxford City Council had a fleet of Street Cleansing LPG vehicles but at the end of their life, none were replaced with LPG. For a while the government offered incentives and the manufacturers produced LPG engines. However, with the loss of incentives no major manufacturer offers a LPG engine option.

3.21 **Hydrogen fuel cell -** Hydrogen powered vehicles are not in common usage as they are still under development. The Council's Fleet Manager recently attended a demonstration on hydrogen fuel cells. Although the emissions are clean as they are just water, the capital cost of such vehicles is enormous (typically more than three times the price of a standard vehicle) and the cost of installing infrastructure is also significant.

3.22 **Electric vehicles -** The Council has evaluated and trialled electric vehicles for over ten years. However, the first purchase of an electric vehicle was almost four years ago, a Renault Kango with a charging point at Thorpe Lane Depot. While the range hasn't been as great as promised it is regularly used and is able to perform a range of functions. More recent demonstrator vans seem to show greater range. Although more costly to purchase initially, there is a government grant to offset most of this increase. Electric vehicles besides producing no emissions from the tailpipe are cheaper to fuel and cheaper to maintain than conventionally powered vans

3.23 Since Thorpe Lane Depot has a large array of solar panels, effectively any electric vehicles are not only zero emission at the tailpipe but since the electricity from solar panels also generates no carbon dioxide, they are close to zero emission overall.

3.24 Range anxiety is an important issue with electric vehicles, the driver worrying that the vehicle will run out of power. Hence a charging point infrastructure is important to operate electric vehicles. Currently there is only one charging point at Thorpe Lane Depot with none at either Highfield, Bicester or Tove, Towcester depots. The expansion of the current infrastructure and the costs associated will have to be considered to support wider use of electric vehicles. Plug in points at Bodicote House will also be needed which will then prompts consideration of whether such plug in points should be available to staff, elected members and members of the public and if so, what charges should be made.

3.25 **Hybrid** - A number of car manufacturers offer hybrid vehicles. Hybrid vehicles have both an electric motor and batteries as well as usually a petrol engine. The vehicle then operates in electric mode in urban environments but on major roads or when the batteries run low it switches to petrol mode. This removes 'range anxiety' which exists with electric vehicles. Unfortunately, for commercial vehicles there are few if any hybrid vans at the moment. However, if the market changes and manufacturers offer hybrid vans they may meet the needs of the Council's fleet

3.26 **Proposed Way forward** - In the vehicle replacement programme for 2017/18 there are seven small car derived vans due for replacement. They are between eight & nine years old.

3.27 When considering the average annual usage, carrying out a cost comparison and looking at the condition of the current vehicles, the following proposal is being pursued. Two of the vehicles (Fiesta vans) are eight years old but have mileages of around 55,000. These two vehicles are in good condition and will be retained and reviewed again in twelve months. One vehicle covers around 15,000 miles per year and the requirements are beyond the capability of current electric vehicles. However, the other four vehicles which do 5000 to 8000 miles per year could feasibly be electric vehicles

3.28 The table below sets out the financial comparison for these four vehicles. Each after a government grant, initially costs an additional £3,500 but the savings in fuel, maintenance and vehicle excise duty mean there is a net financial saving over the expected eight years of the vehicles

	Average annual mileage	Average fuel cost (diesel) (£)	Fuel cost saving with electric vehicle (£)	Estimated annual maintenance saving & road tax saving (£)	Total overall annual saving (£)	No of years to save initial £3500 extra purchase cost
Vehicle 1	4863	486	389	290	679	5.2
Vehicle 2	6920	692	554	290	844	4.1
Vehicle 3	4864	486	389	290	679	5.2
Vehicle 4	9996	1000	800	290	1090	3.2

3.29 A Nissan NV 200 van was tried for two weeks in early October 2017. The van had many positive features with positive feedback on ease of use, driving position etc. with just one concern, which was range anxiety. The current charging unit at Thorpe Lane Depot is a 'trickle 'charge unit taking 8 to10 hours to fully charge. The charging unit in the car park opposite the Forum in Towcester is a fast charge unit taking 2 to 3 hours to fully charge a van. A network at all three depots of fast charge units is required to facilitate electric vans. Although trickle chargers can recharge a vehicle on an overnight charge they do not charge the vehicle swiftly enough during daily operation when needed.

3.31 Discussions with facilities management on installing a charging network at the three depots have taken place and there should be sufficient existing funds in place to install this network. However further capital bids maybe required especially for Bodicote House.

3.32 The trial vehicle has a claimed range of around 100 miles. The trials showed that 70-80 miles was a more realistic figure from the experience of those who tested it. From early 2018 both the trial vehicle and a Renault Kango will have versions with a range of 160 miles. This 160 mile range may again prove to be optimistic but if in real driving conditions a range of 100-120 miles can be achieved this would meet the Council's operational requirements. This increase in range along with the installation of a network of charging points at the three depots may make the inserting several electric vans into the fleet very viable.

4.0 Conclusion and Reasons for Recommendations

4.1 Although work has taken place to reduce diesel usage, vehicle telematics offer an opportunity to reduce usage even further. Telematics has been trialled on two vehicles for over a month and delivered more than 8% savings. Hence telematics can make a significant impact on reducing costs and emissions. The costs of such systems are small compared to the potential savings. If supported telematics should be installed from early 2018

4.2 Diesel vehicles can contribute to air quality issues. Recently there has been a lot of adverse publicity regarding diesel engine vehicles. Improvements in small vehicle technologies mean that the reliance on diesel engine car derived vans can be reduced. With around eight small vans to be replaced over the next twelve months it is possible that more electric vans can be acquired once the appropriate infrastructure of plug in points are installed and new models have an increase in overall range. The additional initial purchase costs of electric vans are more than matched by the reduction in fuel and maintenance costs.

5.0 Consultation

Neighbouring authorities
APSE
Oxford City Council
Facilities Management

6.0 Alternative Options and Reasons for Rejection

6.1 The following alternative options have been identified

Option 1: To support the proposed recommendations

Option 2: To reject the proposed recommendations

Option 3: To ask officers to consider alternative improvements

7.0 Implications

Financial and Resource Implications

7.1 The move to telematics will deliver some net fuel revenue savings from 2018/19.

Car derived electric vans are a higher capital cost but deliver sufficient operational savings to offset these higher initial capital costs. However further capital bids may be required in the future to install a charging network at Bodicote House.

Comments to be checked by:
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Legal Implications

7.2 There are no legal implications associated with this report.

Comments checked by:
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Risk

7.3 With current adverse publicity regarding diesel powered small vehicles the Council could be at risk of this if it does not start to seriously consider alternatives. This will be managed within the operational risk register.

Comments checked by:
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8.0 Decision Information

Key Decision

Financial Threshold Met: **No**

Community Impact Threshold Met: **No**

Wards Affected

All

Links to Corporate Plan and Policy Framework

Cherwell: Safe, Clean and Green

Lead Councillor

Councillor Debbie Pickford, Lead Member for Clean and Green

Document Information

Appendix No	**Title**
1	Fleet and Vehicle Replacement Strategy
Background Papers	
None	
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