Zero Emission Fleet Replacement Strategy

April 2024

Draft

moray council

Definitions

BEV Battery electric vehicle
FCEV Hydrogen fuel cell vehicle
ZEV Zero emissions vehicle
HDV Heavy duty vehicles
ICE Internal combustion engine vehicle (powered by diesel or petrol)
LCV Light commercial vehicle (gross vehicle weight of up to 3.5 Tonne)
RCV Refuse collector vehicle
HVO Hydrotreated vegetable oil (Renewable diesel)

Contents

Executive Summary

As part of the climate change target of net zero emissions by 2045 the Scottish Government (SG) have set a target to replace all public body operated fossil fuel passenger cars by 2025 with a further target for these bodies not to purchase fossil fuel Light Commercial Vehicles (LCV) under 3.5T after 2025 and have these vehicle types phased out in Scotland by 2030. The SG target for phasing out Heavy Duty Vehicles (HDV) is by 2040.

Moray Council have demonstrated a clear commitment to net zero targets through the commencement of a vehicle transition programme. At present, the council's existing fleet contains a total of 47 electric vehicles. This early and committed ambition to vehicle transition has put the Council in a strong position to ensure continued compliance with government regulations as net zero targets approach. This report will clearly outline a continuation of the current replacement efforts to enable Moray Council to remain on target to ensuring the adoption of Zero Emission Vehicles (ZEV) meet current national policy commitments.

The delivery of the council's fleet replacement programme will be heavily dependent on the availability of suitable electric vehicle replacements that will meet the wide spectrum of operations and services that they support. Therefore, a phased replacement plan is suggested, reflecting the uncertainties in the supply of vehicles, their operational capability, and affordability.

The council has approved that in relation to vehicles, the development of the council's ZEV strategy and transition to net zero is aligned with SG targets. Between now and 2040, the market is expected to mature significantly with greater choice and reduced costs. Whilst the SG targets are not binding on local authorities, they are a material policy consideration and align with the council's own Climate Change Strategy.

This strategy sets out a routemap to demonstrate the councils commitment with options identified setting out our transition plans within it. The strategy will set out clear objectives;

1. **Outline the earliest opportunity that its fleet can be zero emission for each vehicle class**
2. **Set out the approach to improve charging infrastructure and identify possible renewable energy source options**
3. **Establish a proposed timeline for this transition whilst meeting SG targets**
4. **Identify separate themes as part of this transition with focus on vehicles, infrastructure and fuel**
5. **Detail the capital investment projected to meet this ambitious transition**

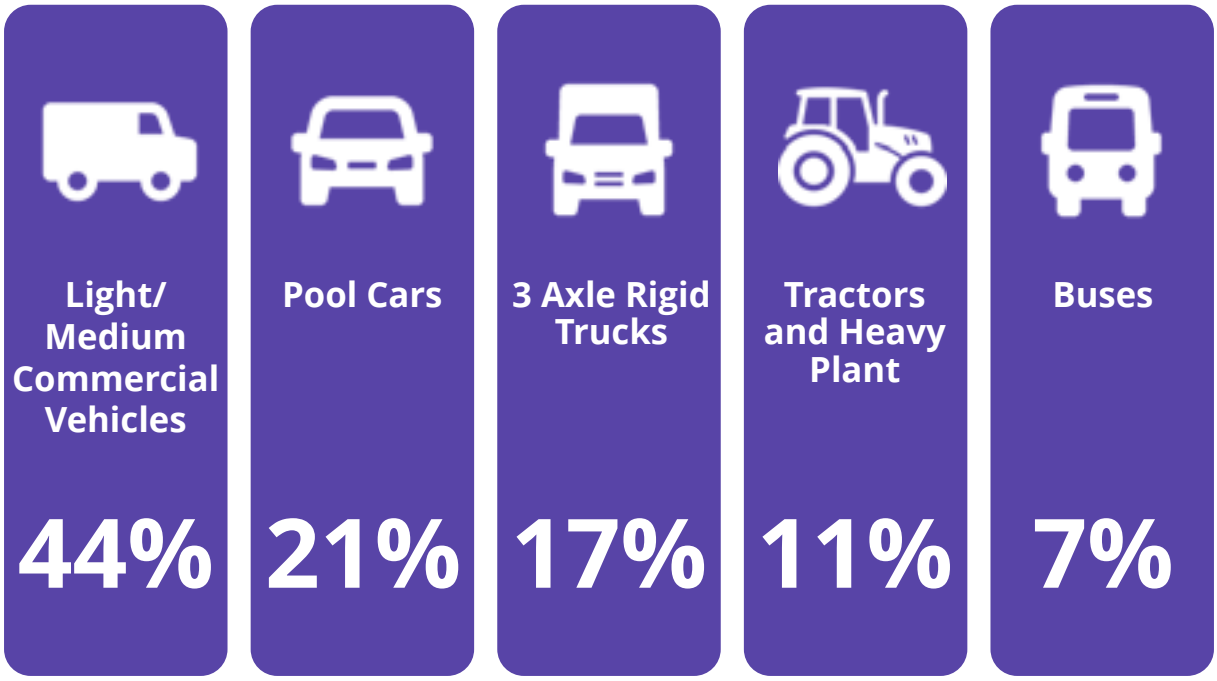
1. Current Fleet Status

1.1 At present, the council's existing fleet contains a total of 47 electric vehicles which represents around 9% of the registered fleet. These vehicles have been well received by Council staff and the wider community. A further 7 electric vehicles are on order. In addition a number of our plant; strimmers, blowers and breakers have been replaced with battery powered alternatives. This early and committed ambition to vehicle transition has put the Council in a strong position to ensure continued compliance with government targets on a net zero approach. It is planned to continue with the current 10 year capital replacement programme to enable the Council to remain on target, identify challenges and ensuring the adoption of zero-emission fleet vehicles meet current national policy commitments.

1.2 The current annual Vehicle and Plant replacement capital budget is £3.53m. Migration to a zero-emission fleet is going to be a complex process which will take a number of years. Whilst good progress has been made it is evident that issues such as supply chain pressures and price inflation are extending the lead times for vehicles and infrastructure. Many manufacturers are still at the prototype stage, and this makes whole life costing, including estimating residual value of vehicles, difficult to predict.

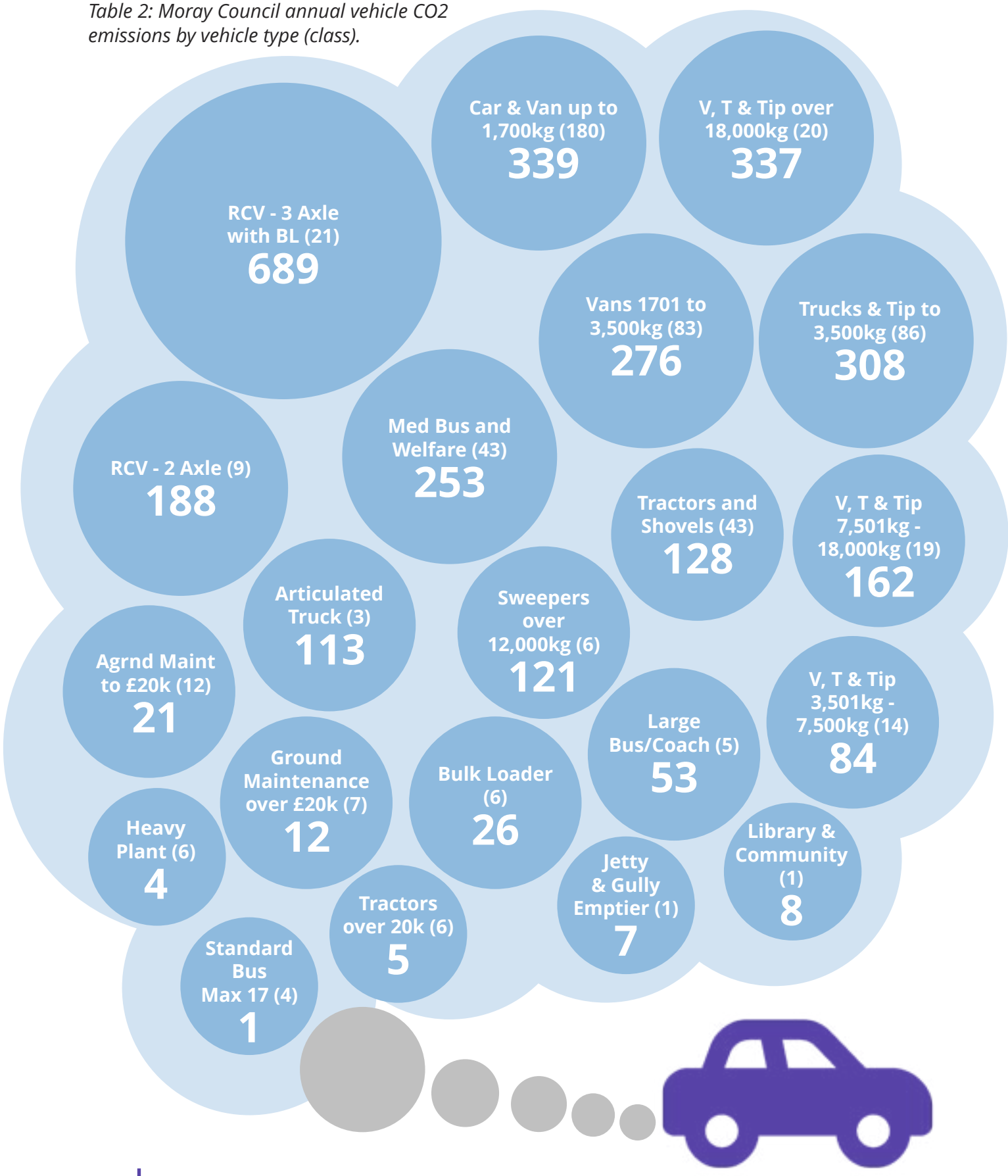
1.3 There are 525 registered vehicles in our main operational fleet, dominated by light commercial vehicles with medium vans being the largest vehicle segment (44%). The remainder of the fleet consists of pool cars (21%), heavy goods vehicles dominated by 3 axle rigid trucks (17%), buses (7%) and the remainder are tractors and heavy plant (11%), which is highlighted in Table 1 below;

Table 1: Current fleet distribution



1.4 The council's vehicle and plant fleet are grouped into classes associated with the size and type of vehicle. Table 2 below shows the classes and the emissions associated with those classes based on fuel consumption averaged across each vehicle class.

Table 2: Moray Council annual vehicle CO2 emissions by vehicle type (class).



2. Zero Emissions Fleet Replacement Strategy

2.1 Fleet Strategy is very much focussed on supporting front line Services as the council transitions from petrol/diesel vehicles and plant machinery to a zero-emission fleet. The fleet plays a vitally important role in providing frontline services to the residents of Moray and this must be done in a cost effective, efficient, and environmentally friendly way.

2.2 Given the wide range of vehicles in operation, at this moment in time there is not one single technological solution to reduce the council's carbon footprint and some technologies are not yet considered mainstream solutions. All the current available technology has been considered in our proposed strategy. The hardest task for fleet decarbonisation relates to the larger/heavy duty vehicles.

2.3 The Council's fleet services management team have developed a proposed strategy with key and separate themes to aid our transition to net zero. This is outlined in Table 3 below.

Table 3: Fleet management strategy

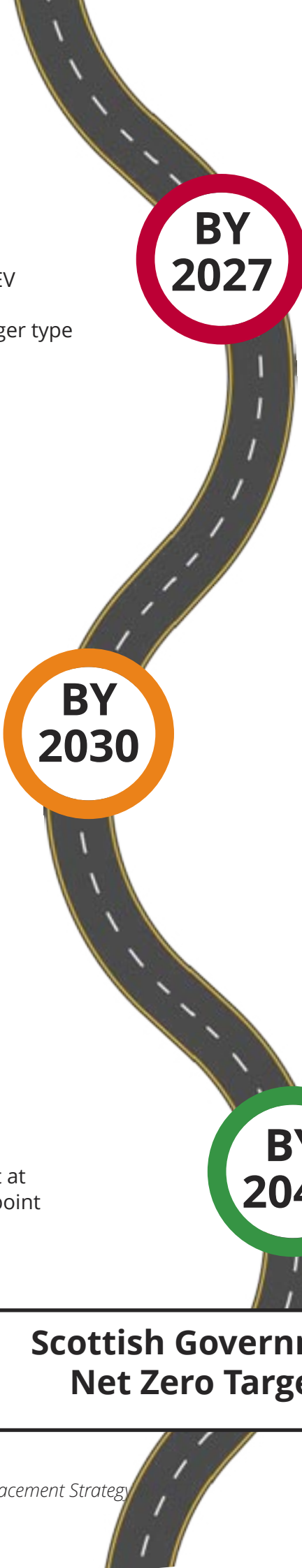
	2024 - 2027 - 3 Year Plan	By 2030	Vision by 2040
VEHICLES	• Arrange in house training for vehicle technicians • Continue to purchase suitable small ZEV when due for replacement • Allow for the ZEV market to mature • Replace larger type vehicles with low emission fossil fuel • Undertake trials of suitable EV/hydrogen larger vehicles when available	• Aim to have 100% ZEV small cars/fewer diesel vans on fleet • Undertake trials of suitable EV/hydrogen vehicles when available • Review overall vehicle fleet with Services across the Council with a view to reduce vehicle numbers subject to operational needs • Monitor market for specialist fleet availability such as JCBs, loaders	• 100% ZEV for small vehicles • Aim to replace large fossil fuel vehicles with ZEV at closest life cycle replacement point leading up to 2040
INFRASTRUCTURE	• Review infrastructure as part of depot/buildings review • Engage with DNOs to map out future needs • Continue with small scale installation of EV charging infrastructure	• Engage with DNOs to map out future needs • Provide appropriate charging infrastructure at identified depots/buildings to suitably manage transition	• Infrastructure in place at identified depots/buildings to ensure charging/refuel capacity to run our ZEV fleet
FUEL	• Consider HVO as a short term option • Monitor market for hydrogen opportunities • Visit other LAs/Partners with hydrogen in situ	• Monitor market for hydrogen opportunities and work with strategic fuel partners to develop suitable infrastructure	• Hydrogen fuel infrastructure in place to complement EV infrastructure to allow capability to run fleet from different types
OTHER	• Development of fleet decarbonisation working group to bring together the separate alternative fuels and strategies currently being developed by separate teams • Identify capital investment required to move to ZEV fleet • Secure capital funding commitment • Continued communications with all stakeholders • Report to council on progress	• Consider partnership opportunities • All fleet technicians to have appropriate EV/alternative fuel training • Report to council on progress	• Report to council on progress • Aim to have all fossil fuel vehicles to be phased out and ZEV fleet equivalent infrastructure in place • Demonstrate our commitment to meet ambitious SG targets

2.4 To meet the challenges of addressing our strategy, both the Energy Saving Trust (EST) and Jacobs consultants have assisted in the development and acted as a sense check to the approaches being proposed. This has involved considerations of our current fleet and infrastructure and to offer technical advice on the broad timing and sequencing of the Council's continued move to a zero emissions fleet.

2.5 These independent reviews also identified that the Council continues to focus our transition efforts on smaller and medium size vehicles (Classes 1 & 2) which we have already started to adopt. This provides a significant impact in terms of number of vehicles to be transitioned, as 220 vehicles are within these classes. These can be replaced with limited impact on day-to-day operations.

2.6 In summary, it will be very difficult at this time to predict with certainty the exact make up of our vehicle fleet by 2040, due to the number of moving variables such as fuel costs, availability of vehicles, maturity of markets, and technological changes.

2.7 Our immediate short-term actions are summarised in timeline chart overleaf which are focused on developing the Ashgrove site, continuing to install additional EV charging points at the outer district sites, engaging with suitable trials as and when available and considering alternative fuels outlined in section 5 below for short term gains. This will allow the Council to move forward the decarbonisation of its fleet while constantly reviewing and updating the strategy to reflect growing certainty and more obvious paths forward.



VEHICLES

INFRASTRUCTURE

BY 2027

- Continue to purchase small ZEV
- Trial suitable EV/Hydrogen larger type vehicles when available

- Review as part of depot review
- Engage with DNOs
- Small scale installation of infrastructure to continue

BY 2030

- Aim to be 100% ZEV for small vehicles and meet SG targets
- Aim to reduce large vehicle fleet by 5%

- Alternative Green Hub solutions installed at Ashgrove Depot
- Hydrogen/Other fuel types considered

BY 2040

- Aim to replace large fossil fuel vehicles with ZEV replacement at closest lifecycle replacement point
- 100% ZEV for small vehicles

- Green Hub introduced at outer satellite depots
- Hydrogen refuelling points in site

Scottish Government Net Zero Targets

3. Vehicles

3.1 The maturity of the ZEV market continues to be an issue, but whilst saying that, we are aware the market is poised for significant growth. At the time of writing this report, there are still not sufficient numbers of vehicles on the market and certain themes of vehicles are not yet available. Table 4 below outlines our short term 3 year plan against vehicles theme from our overall fleet strategy

Table 4: Vehicle - 3 year plan

Task	Year 1		Year 2				Year 3			
	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Q2 2025	Q3 2025	Q4 2025
Continue to purchase suitable ZEV for cars and light vehicles when due for replacement										
Continue to replace larger type vehicles with low emission until 2028 & end replacement lifespan of larger vehicles										
Develop a replacement plan for large vehicle replacements due after 2028										
Undertake trials of suitable EV/hydrogen vehicles when available										
Continue to monitor ZEV options for larger type vehicles/specialist vehicles										
Aim to have fewer diesel cars/vans on fleet										
Review overall vehicle fleet with Services across the Council										
Aim to reduce overall fleet										
Monitor market for specialist fleet availability										

3.2 The electric vehicles that are on the market in some vehicle types have insufficient range and payload to undertake their daily duties within a normal working day and would require recharging part way through which would impact on service delivery.

3.3 The high upfront cost of purchasing ZEVs and the additional cost of project management for installing charging infrastructure and ongoing management of the infrastructure needs to be addressed in more detail, and there will be an associated capital cost required for any types of infrastructure required. At the present time whilst officers can report that the cost of EV cars has significantly reduced over the last few years, the cost for large electric and hydrogen vehicles is still in the region of 2 to 3 times more expensive than the current comparative vehicle in our existing fleet, such as buses, refuse lorries, gritting vehicles etc. There are also widely reported concerns from the vehicle industry that many vehicle suppliers have not begun to consider ZEV alternatives for specialist and bespoke vehicles.

3.4 Consideration will be made to migrate the council's larger HDVs to hydrogen but again this is not straightforward. Until hydrogen vehicles are available in more commercial quantities the cost will remain high, likewise the production and distribution of hydrogen is of equal concern. Industry experts such as EST predict that it will be after 2025 and closer to 2030, before manufacturers are producing vehicles in any reasonable quantity. Large hydrogen vehicles are in the region of 4 times the cost of diesel-powered alternatives.

3.5 It is planned to continue with appropriate vehicle trials when they become available, focused on EV and hydrogen for the larger vehicle type replacements. The outcome of these trials will be shared with the climate change board and regular updates will be provided from the decarbonisation working group that is proposed to be established. Lessons learned will form the basis of any changes/updates to our overall ZEV strategy.

3.6 Table 5 below shows the proposed priority of vehicle types to replace based on availability and suitability of vehicles. This proposal is in line with the SG target to replace all ICE cars from council fleets by 2025 and to replace all LCV up to 3.5t with ZEV at their normal replacement age. However, this is subject to available infrastructure, on-going depot review, available resources and capital funding. It should be noted that the target will not be achievable without considerable support in these areas.

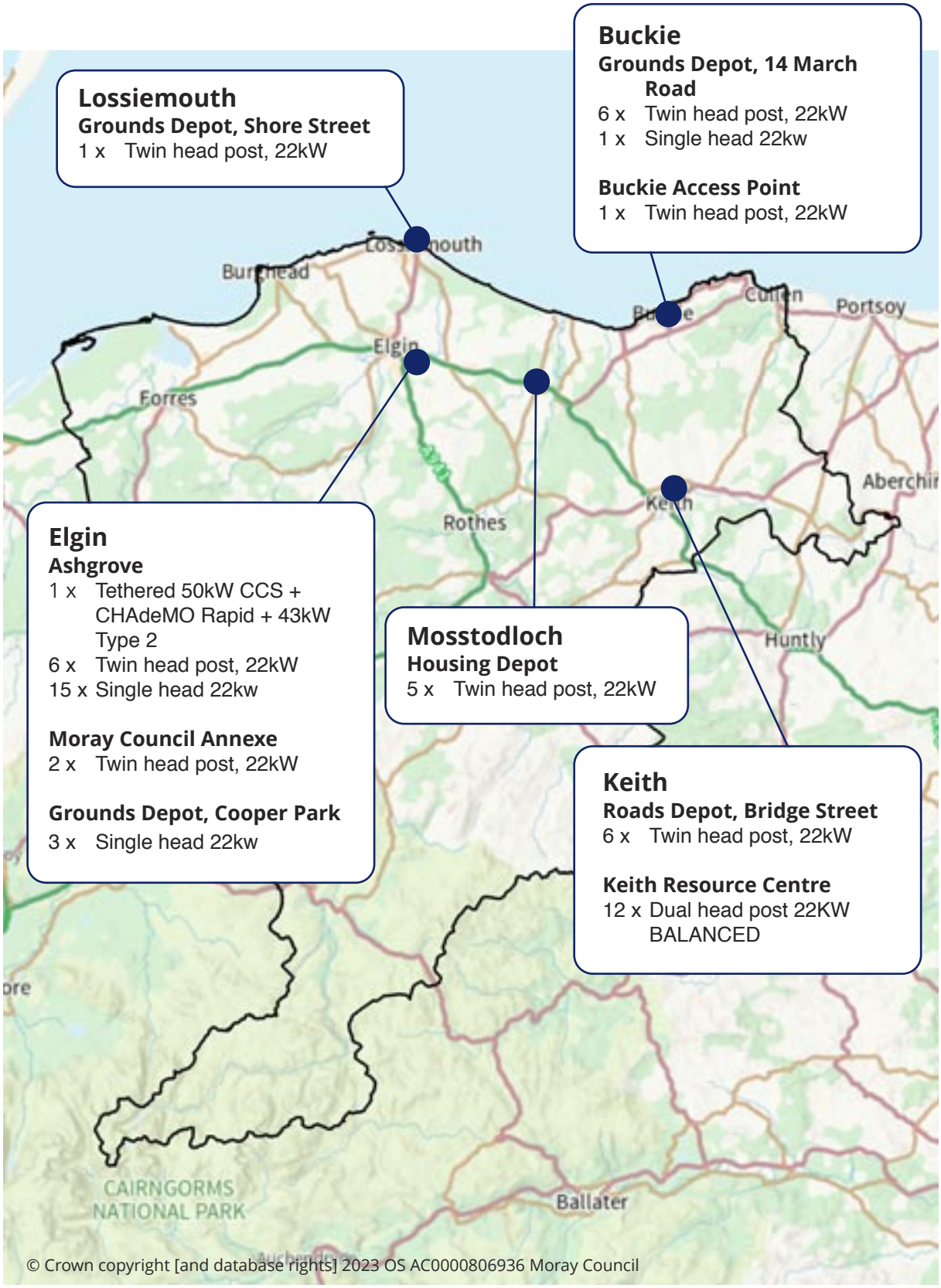
Available now | Limited Availability | Very Low Availability | Rare / Trial phase | Not widely available / development phase

Vehicle Class	Total	Vehicle Class	Annual Fuel Consumption (for Group) Litres PA	Average litres per vehicle in group PA	Co2 Per litre	Total class tonnes CO2 PA	kg CO2 average per veh PA	Electric Cost % increase over Diesel 2020	Indicative cost Diesel version	Whole Fleet indicative Diesel replacement value / Cost	Indicative cost Electric version	Whole Fleet indicative EV purchase cost
1	178	CAR & VAN UP TO 1700	135,119	759	2.51	339	1905.33	40	£22,500	£4,005,000	£31,500	£5,607,000
2	74	VANS 1701 TO 3500	110,132	1488	2.51	276	3735.56	67	£30,000	£2,220,000	£50,000	£3,700,000
8	30	MED BUS & WELFARE	100,869	3362	2.51	253	8439.37	214	£75,000	£2,250,000	£235,000	£7,050,000
14	5	LARGE BUS/COACH	21,035	4207	2.51	53	10559.57	323	£140,000	£700,000	£452,000	£2,260,000
7	4	STANDARD BUS MAX 17	478	120	2.51	1	299.94	250	£30,000	£120,000	£75,000	£300,000
3	73	TRUCKS & TIP TO 3500	122,666	1680	2.51	308	4217.69	47	£34,000	£2,482,000	£50,000	£3,650,000
4	14	V,T&TIP 3501 - 7500	33,471	2391	2.51	84	6000.87	50	£60,000	£840,000	£90,000	£1,260,000
20	1	LIBRARY & COMMUNITY	3,314	3314	2.51	8	8318.14	146	£150,000	£150,000	£370,000	£370,000
6	18	V,T&TIP OVER 18000	134,268	7459	2.51	337	18722.93	150	£160,000	£2,880,000	£400,000	£7,200,000
11	15	RCV 3 AXLE WITH BL	274,369	18291	2.51	689	45911.08	125	£200,000	£3,000,000	£450,000	£6,750,000
5	15	V,T&TIP 7501 - 18000	64,473	4298	2.51	162	10788.48	125	£85,000	£1,275,000	£191,000	£2,865,000
19	9	RCV - 2 AXLE	74,825	8314	2.51	188	20867.86	166	£150,000	£1,350,000	£400,000	£3,600,000
9	5	SWEEPERS OVER 12000	48,401	9680	2.51	121	24297.30	157	£175,000	£875,000	£450,000	£2,250,000
21	2	ARTICULATED TRUCK	44,989	22495	2.51	113	56461.19	203	£99,500	£199,000	£300,000	£600,000
17	1	JETTER & GULLY EMPTY	2,634	2634	2.51	7	6611.34	130	£195,000	£195,000	£450,000	£450,000
24	32	TRACTOR & SHOVELS	51,072	1596	2.51	128	4005.96	206	£98,000	£3,136,000	£300,000	£9,600,000
25A	13	GRND MAINT TO £20K	8,261	635	2.51	21	1595.01	200	£18,000	£234,000	£54,000	£702,000
25C	8	HEAVY PLANT	1,720	215	2.51	4	539.65	200	£95,000	£760,000	£285,000	£2,280,000
25B	6	GRND MAINT OVER £20K	4,766	794	2.51	12	1993.78	300	£25,000	£150,000	£75,000	£450,000
24A	6	TRACTORS OVER 20K	1,962	327	2.51	5	820.77	300	£90,000	£540,000	£270,000	£1,620,000
23	4	BULK LOADER	10,190	2548	2.51	26	6394.22	300	£150,000	£600,000	£450,000	£1,800,000
			1,249,014			**3,135**				**£27,961,000**		**£64,364,000**
										Fleet Value		**EV Fleet Value**

Table 5: Proposed priority of vehicle types to replace based on availability & suitability of vehicles

4. Charging Infrastructure

4.1 Table 6 below outlines our short term 3 year plan for our infrastructure theme from our overall fleet strategy.



4.2 Many of our current depots and buildings are likely to have reached their electrical capacity. Recent infrastructure works to provide additional EV charging at Ashgrove Depot have now taken up most of the available electrical capacity.

4.3 Electricity infrastructure to support charging of a large number of vehicles needs to be thoroughly assessed in order to support future phases of fleet replacement. A partial transition is recommended to minimise any risks associated with day-to-day operations of electric fleet and allow the Council to develop its understanding of the implications.

4.4 It is proposed that Ashgrove Depot is developed as a 'Green hub/depot', with solar/green energy production. On site we have extensive south facing roofs which could generate income as the EV transition progresses, facilitate battery storage & future vehicle charging. This would also include options for hydrogen storage & workshop facilities to be appraised for suitability. Following initial site investigations undertaken it has been suggested that the Ashgrove green hub proposal presents an opportunity for significant lifetime energy savings in the order of £500k. It is proposed that this will be considered alongside our infrastructure options as part of the on-going wider depot review.

4.5 Once completed and reviewed, this model is proposed to be rolled out to other larger depots such as Keith and Buckie. Concurrently small-scale pool car infrastructure can be developed where feasible such as more isolated offices.

4.6 The advantages of transition by depot are that it allows for learning from the Ashgrove upgrade to be built in to the remaining depot upgrades which will allow a cost appraisal and a more focussed approach, Upgrading Ashgrove Depot to a 'Green hub/Depot' would be a 'flagship' project and there is opportunity to generate income through green energy production in the interim & make savings in the future. This approach will also offset potential DNO upgrade costs at Ashgrove and potentially at other depots. The disadvantages are that not all vehicle types will be available at present although as the project develops, they will become available, and the depot improvements will allow these vehicles to be serviced and maintained as they come on stream.

4.7 It is widely known within the industry that the lead time for the installation of appropriate charging infrastructure is a major factor and a certain level of contingency needs to be allowed for. Applications for electricity grid connections have quadrupled in the last 4 years and requesting estimates for proposed upgrades/new infrastructure from the council's electrical DNO is proving difficult due to the challenges and demand they are facing on their network. These issues therefore make a good case to further explore potential levels of battery storage as suggested above and support the alternative green hub proposals for Ashgrove depot.

4.8 It is suggested as a general principle that electric vehicles will have 1 charge socket each and operate on a 'Back-to-Base' system so that vehicles charge overnight and, in most scenarios, can achieve their duty cycle on one charge. Load balancing will be adopted to reduce the load on a charge point that has two or more sockets, this is where the charge point manages the load across the sockets or site overnight to reduce peak power draw and allows all vehicle's to be charged.

4.9 The installation project for infrastructure is fundamental to the transition to electric vehicles and net zero, the transition to ZEVs cannot progress at each phase until the infrastructure is in place. It is proposed to create a working group with officers from Fleet Services, Corporate Property and Climate Change team to collaboratively deliver infrastructure across our buildings and depots, in line with the Council's depot strategy.

4.10 Resources may also be required to facilitate growth in managing the electric charging infrastructure and associated back office systems.

5. Fuel

5.1 There are currently a number of different alternative fuels outwith electricity. In the short term it is proposed to explore in more detail the benefits and risks in considering other fuel types.

5.2 Officers within the Fleet team have participated in a number of working groups and have developed good relationships with other local authorities who are currently progressing with ZEV alternative vehicle trials.

5.3 It is proposed that a report will be taken through the climate change board to seek any agreement in pursuing trials with alternative fuels and type before any wider implementation.

5.4 A brief overview of the alternative fuel types are detailed overleaf.

Hydrogen

At present, hydrogen fuel cell vehicles albeit fully zero emission, are more expensive in terms of capital and fuel cost than both their diesel and battery electric counterparts, there are also few hydrogen vehicles commercially available on the market across the UK. As such, the business case for purchasing hydrogen vehicles currently remains weak. Although there are commercial hydrogen cars and light vans available, the market for electric cars is more developed and offers a more cost-effective way to reduce emissions.

For heavy goods vehicles and large vehicles, it is likely that the technology will allow for a combination of electric and either hydrogen or biogas vehicles to be most suitable to the needs of a fleet which covers both rural and urban areas and both longer distance and shorter back-to-base operations.

It is likely that it will be after 2025 before hydrogen is produced in large enough quantities to become a reliable large-scale alternative to diesel and possibly closer to 2030 before large hydrogen vehicles are produced in commercial numbers for the cost of these reduce.

However, in order to get to the stage where hydrogen would be a viable alternative for the fleet it would be necessary to put in place small scale pilot projects to support the development of refuelling infrastructure and training of vehicle technicians. Pilots could include retrofitting hydrogen onto diesel vehicles to allow dual fuel hydrogen/diesel vehicles as a bridging technology until the market for full hydrogen fuel cell vehicles becomes more developed.

The Council is looking at external funding opportunities that would be required for such a pilot to progress. Partnership opportunities with Aberdeen City Council and Aberdeenshire Council are being explored.

In addition, both the Ministry of Defence (MOD) and National Health Service (NHS) are also interested in exploring hydrogen for their respective fleet vehicles and there may be partnership opportunities for future development.

Biogas

Biogas is created from distillery waste and is already used as a low carbon fuel for delivery vehicles within the distillery industry. The anaerobic digestion technology to convert such waste into fuel is already operating in Moray. Trialling biogas in partnership with the whisky industry is an opportunity for the Council to support the expansion of biogas as a vehicle fuel. As these technologies are scaled up and biogas is more available, this would be a reliable source of local low carbon fuel.

Using biogas as a vehicle fuel is not a new technology and the cost of biogas vehicles compare favourably with electric vehicles. As with hydrogen, it would be necessary to put in place small scale pilot projects to support the development of refuelling infrastructure and associated technical expertise. Such a pilot should be centred round developing training opportunities for mechanics and drivers, and developing expertise and confidence on rolling out biogas vehicles as and when appropriate.

HVO

Hydrotreated Vegetable Oil (HVO) is produced from a plant based, renewable source which produces up to 90% less CO2 at the tailpipe and less (or possibly equal) Nitrogen Oxide (NOx). It is a direct replacement for the current fossil fuel diesel which we are all familiar with so no changes are required on any part of the infrastructure or vehicle.

The engine's combustion is slightly hotter and the fuel gives a very small increase in power due to the higher cetane levels, however, other than a change in fuel efficiency (plus or minus) the engine is not affected by the fuel in any way, and the cooling system can handle the slight increase in combustion temperature without concern.

HVO has received a lot of attention due to the way in which it is produced. The production process information is ambiguous at best, with many sources both for and against the use of HVO pitching their ideas of how and where the raw material is sourced. The main issue comes from the use of virgin palm oil and how this oil is produced to supply the refinement companies.

Currently Indonesia and Malaysia supply 34% and 11% (respectively) of oil to the HVO industry, of which a portion is palm oil. HVO is usually 80% 'other products' such as fatty distillates and waste organic material with only 20% virgin oil, of which palm oil is one virgin oil product. Other oils are rape seed, sunflower oil, vegetable oil or soy bean oil, etc. The growing of oil palm trees in Malaysia and Indonesia is adding to the deforestation of ancient forests, threatening the habitats of many endangered species. This poses the question of carbon outsourcing; the moving of the carbon issue to other countries.

The use of this fuel may also be the interim solution until such time as alternate fuels such as Electric or Hydrogen are able and available to be introduced. Apart from cost there looks to be no major risks in adopting the fuel. It is proposed to undertake further monitoring of fuel price and availability, to enable further research and cost benefit analysis to be carried out.

Fuels such as HVO have advantages as a bridging technology in the short term but do have a number of disadvantages. A detailed report will be taken through climate change board before any trials of considering the use of alternative fuels are undertaken.

6. Fleet replacement lifecycle planning

6.1 It is critical that the Council aims to operate vehicles to an optimum life which considers vehicle reliability with age, the associated maintenance costs and predicted residual values, with the aim of replacing vehicles before they increase financial liability through age, mileage, and depreciation. A modern fleet also has benefits for employees, safety, and the Council's image.

6.2 By planning fleet replacement, procurement requirements can be addressed early, with opportunities to engage with the local market and secure manufacturers 'build slots' well in advance of when delivery is required. This also brings value in large scale procurement exercises, to bring economies of scale and add social value.

6.3 Fleet management have taken time to review the current fleet establishment to ensure that the Council's fleet continues to be fit for purpose, is aligned to the Councils obligations to meet the SG targets and become net zero by 2040. It is crucial that a long term and sustainable financial plan is in place to ensure successful delivery of the transition programme.

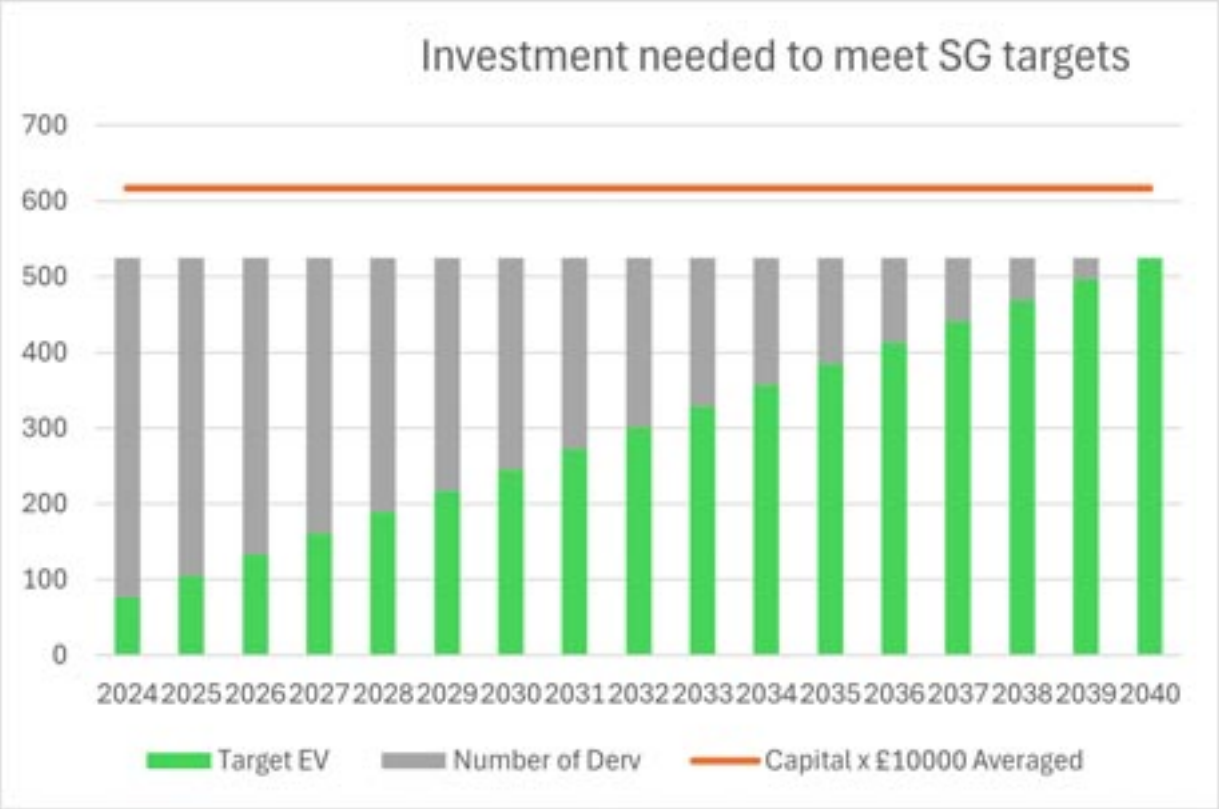
6.4 it is therefore proposed that the Council's Fleet Replacement Programme is maintained to ensure an optimum operating age profile of a maximum 7-year profile for LGV and cars and a 10 year profile for HDV, mobile plant, and small hand-held plant will continue to be assessed for replacement based on their condition. This will minimise expensive repair costs and give an enhanced residual value of the asset on replacement.

7. Capital Investment projections

OPTION 1 – Enhanced Capital Spend
To meet ambitious SG targets and all fossil fuel vehicle types phased out by 2040

7.1 As outlined earlier within this strategy, there is presently large cost disparity between Internal Combustion Engine (ICE) powered and electric/hydrogen alternatives for the larger heavy goods vehicles (HGV) and specialist vehicles. It is suggested to meet in full the ambitious SG and council targets to be net zero is not viable from a financial and general risk perspective to purchase these as electric/hydrogen until the market has matured, greater reliability can be ensured, and economies of scale have led to a reduction in prices.

7.2 The chart below highlights the capital investment and required number of ZEV vehicles to be purchased each year between now and 2040 to achieve full compliance with the SG target on phasing out fossil fuel vehicles by 2040.



7.3 It is suggested that there is significant financial risk with seeking full transition by 2040. It is still very much emerging technology, with many of the larger vehicle types not wholly available and tested. The chart above suggests that at current prices that a capital investment of £6m per year would be required and may not be the best use of investment taking into account that the Council would be disposing of many of its fossil fuel vehicles before they have reached their optimum life term and age profile.

7.4 The provision of suitable charging infrastructure, especially in the immediate short term, will be challenging to have in place and fully operational. Charging Infrastructure is very much reliant on grid capacity and engagement should be undertaken with DNOs soon to establish a way forward.

7.5 It must be clear that projections are made at today's vehicle replacement prices and it is highly likely that these projections will change as the market matures and is subject to the future availability of vehicle types.

OPTION 2 – Steady State Capital Spend
Phased Fleet replacement lifecycle planning approach

7.6 Option 2, would see the council's overall capital investment at £60m over the next 17 years and allow us to have 353 vehicles at zero emission. This would not meet the ambitious SG targets currently in place but would demonstrate the Council's commitment which would be affordable in line with current capital spend on fleet.

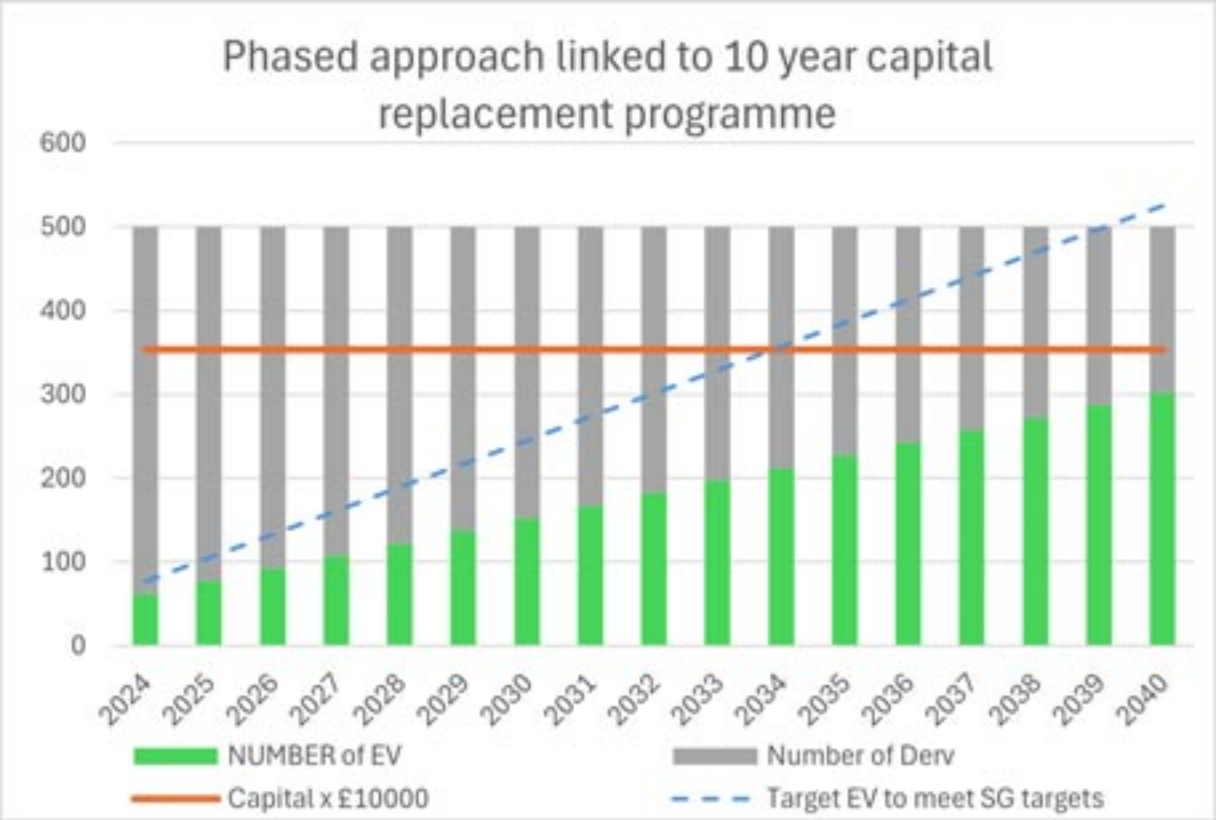
7.7 There are still risks associated with seeking a high percentage of electric vehicles as it is still developing technology. However, the Council has taken a strategic approach to determine it seeks electric options where there is a clear and established market, for example in cars and commercial vans.

7.8 This proposal allows the Council to continue with his current lifecycle planning approach as set out within the Council's 10 year capital planning process. It will allow the Council to continue to operate vehicles to an optimum life which considers vehicle reliability with age, the associated maintenance costs and predicted residual values, with the aim of replacing vehicles before they increase financial liability through age, mileage, and depreciation.

7.9 During this transitional approach the Council will continue with the development of internal staff to be fully trained to maintain these alternative fuelled vehicles from our existing workshop. This will mean that there is sufficient resilience within our operations to adapt to new technology and reduced need to rely on third parties for support.

7.10 The Council will continue to trial new alternative technology to ensure knowledge and facilities are developed appropriately.

7.11 The chart below sets out our current capital fleet replacement budget to continue to replace fossil fuel type vehicles. In addition, the capital investment required to achieve a blend of suitable ZEV equivalents on an achievable phased approach is identified which considers all of the external and internal challenges faced with ZEV transition.



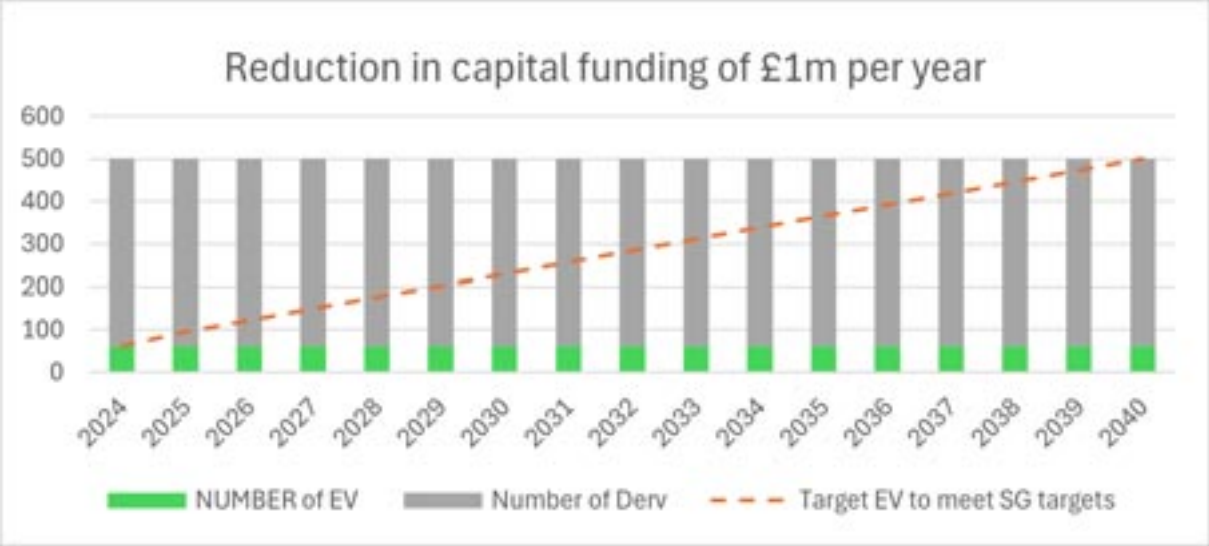
7.12 This option above represents a blend of priorities which meets the initial transitional ambition tied to continuing with the optimum lifecycle planning capital budget allocation. The capital investment is relatively fixed each year during the fixed period and allows for a manageable smoother transition than the wholesale replacement as outlined in option 1 above.

7.13 It should be noted that EV infrastructure will still be a barrier to this transition and must be urgently addressed in line with the depot review and hybrid workstyles if transition to EV is to succeed. Further considerations need to be made in relation to home charging for housing and other vehicles that are currently taken home overnight.

OPTION 3 – Reduced Capital Spend
Phased Fleet replacement lifecycle planning approach with reduced capital investment

7.14 The Council continues to face a very difficult financial situation with having to find savings over 2024/25 and 2025/26 of approximately £13.5 million. It is estimated that £10m of savings will need to be made in 2024/25 taking account of savings that have already been identified. This means that the Council has no choice but to make significant changes to the services that are delivered, and require to continue to reduce spend.

7.15 One proposal put forward is to introduce a capital cap within the current 10 year capital plan. The chart below highlights with a reduced capital investment the number of ZEV vehicles that would be purchased and how this would impact the transition in becoming net zero and meeting the SG targets currently in place.



7.16 Adoption of this proposal will effectively halt the transition to EV and in addition will extend the age profile of the fleet. Extending the age profile of the fleet will have the following consequences, some of which are directly opposed to SG targets;

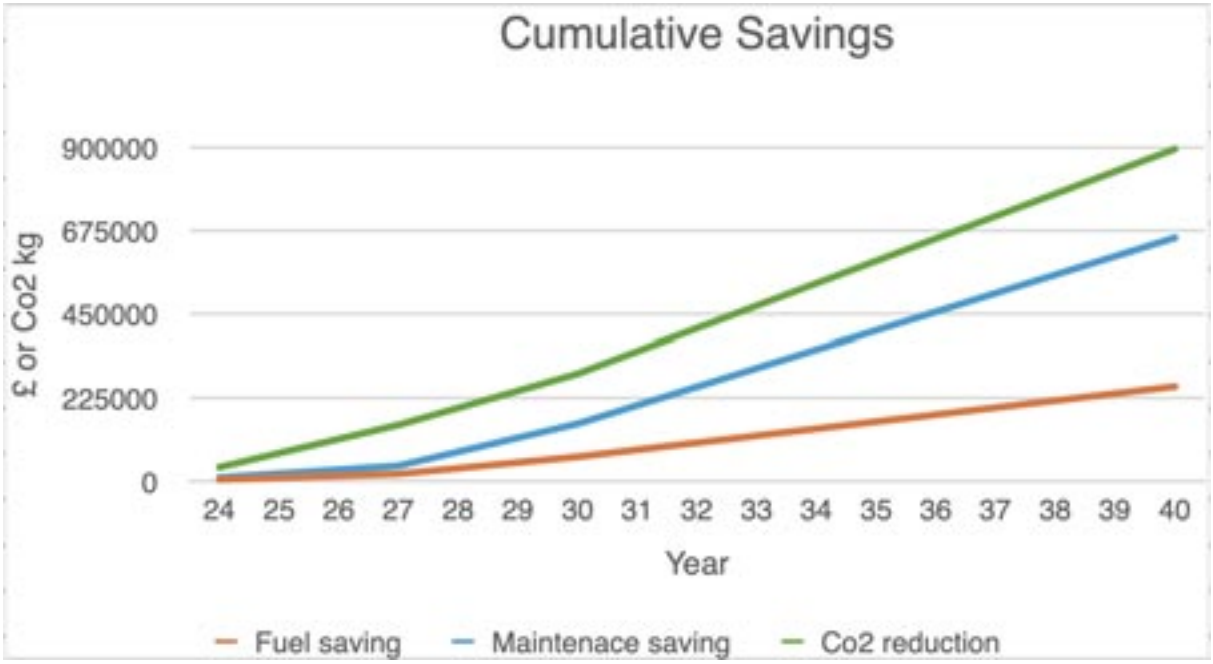
- Increased maintenance costs
- Increased downtime
- Increased labour time (- this is expensive and in short supply)
- Potential for major component failure of assets leading to hire costs
- Increased carbon emissions
- Poor fuel economy
- Poor public image

7.17 To summarise the above options; In order to fully meet the SG targets and have all the Councils fleet ZEV by 2040 would cost the Council over £107m. This is a £47m additional capital investment and would result in replacing fossil vehicles well before their optimum lifetime. There is also significant risk in not having the appropriate charging infrastructure in place to cope with such wholesale vehicle replacement.

8. Potential Savings

8.1 The basis of our proposed ZEV strategy is to comply with the government's aims. Given more optimistic expectations of when larger vehicles are available as outlined in this report, our approach fully complies with SG ambitions.

8.2 The chart below outlines the general downward trend of the operational costs associated with this replacement scheme. In our assumptions, a switch from an ICE vehicle to an equivalent electric vehicle comes with some cost savings. One saving noted within the cost model is the saving on diesel. Even with increasing electricity prices charging an electric vehicle is noticeably less than the cost of diesel.



8.3 An additional benefit of this transition to electric is the carbon emissions saved from the day-to-day operations of the current ICE fleet. The chart below outlines the approximate savings (tCO2) per year that our proposal is forecast to provide.