apse association for public service excellence

Use of EV fleet and alternative fuels in refuse collection vehicles

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About APSE

The Association for Public Service Excellence (APSE) is a not-for-profit local government body working with over 300 councils throughout the UK.

Promoting excellence in public services, APSE is the foremost specialist in local authority frontline services and operates one of the UK's largest research programmes in local government policy and frontline service delivery matter

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1 Research context

At the APSE Performance Networks Seminar in December 2021, enquiries were raised around the use of electric vehicle (EV) fleet and alternative fuels in refuse collection vehicles (RCV). This was unsurprising. With over 300 local councils having declared a climate emergency, councils have started to investigate practical actions which can be undertaken to decarbonise council services, including fleet, in their various frontline areas.

Whilst waste is one of the lower emitting areas for carbon, with the Committee on Climate Change Local Authority report in December 2020 identifying just 5% of greenhouse gas emissions from waste[1], it is the transport used within the waste sector where a real difference could be made. Surface transport is amongst the highest emitting sector in the UK economy, making up 22% of UK emissions in 2019. It stands to reason that councils can ignore the fleet used in refuse and recycling services which is a public service area highly reliant upon heavy goods vehicles.

However, the cost of change, and emerging technologies in the RCV sector, creates challenges for councils. If they take the plunge on one particular technology, will this be quickly obsolete when other options emerge? Equally for some to transition they may also need to consider changing the infrastructure or location of their depots.

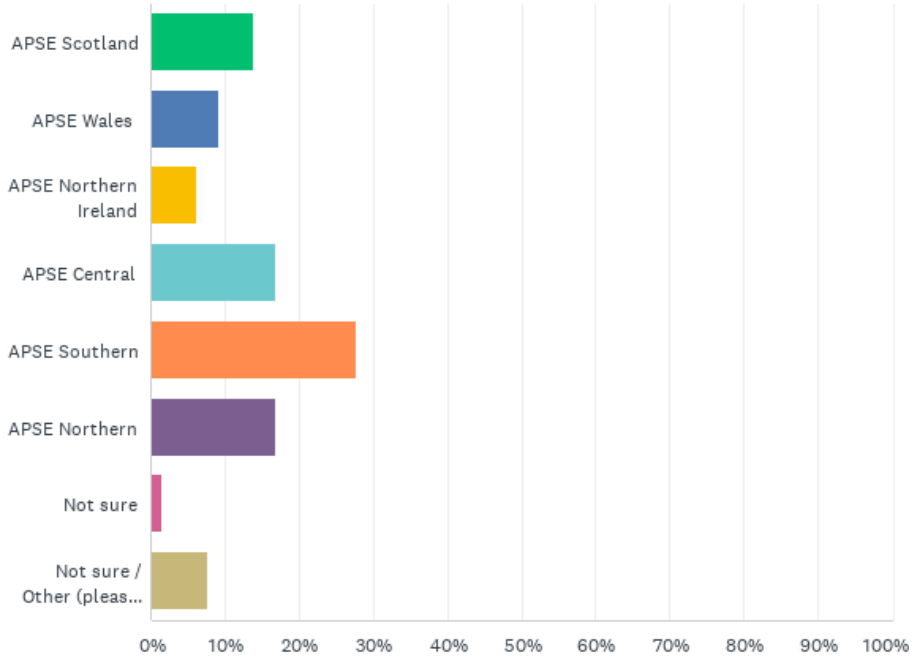
With this in mind, APSE decided to embark on a piece of research with its member councils across the UK to explore barriers to, and opportunities for, greening the RCV fleet. With the cost of a new RCV running at between £150,000 to over £300,000, it is not a decision that councils can afford to get wrong.

2 Methodology

The first step of the research involved the setting up of a broad reaching online survey across UK councils about greening their refuse fleet. A total of 70 respondents submitted their views in March 2022 with a completion rate of 100%. This provides a good representative sample from APSE's cohort of around 200 collection authority members.

[1] https://www.theccc.org.uk/publication/local-authorities-and-the-sixth-carbon-budget/

Respondents were relatively evenly spread across APSE's six areas of activity: APSE Scotland, APSE Wales, APSE Northern Ireland, APSE Northern, APSE Southern and APSE Central.



After the survey, the next stage was an online roundtable discussion, to further explore the survey results and triangulate that data with roundtable participants across APSE member councils. The roundtable was held in May 2022 and was attended by 55 people on Microsoft Teams.

Following the roundtable, the research identified nine UK local authority refuse services for semi structured interviews, each at a different stage of the transition journey. Due to ongoing social distancing during the course of the research, the case study interviews were conducted online; nevertheless, this helped to provide a rich context to the interviews drawing out innovative practices. The interviews were held in June 2022.

3 Survey results

To get an initial understanding to where local authorities were in relation to their transition journeys in greening their fleet, a broad reaching survey was sent out to APSE member authorities to help build a general picture. The survey results are as follows:-

What is your operating model for refuse services?

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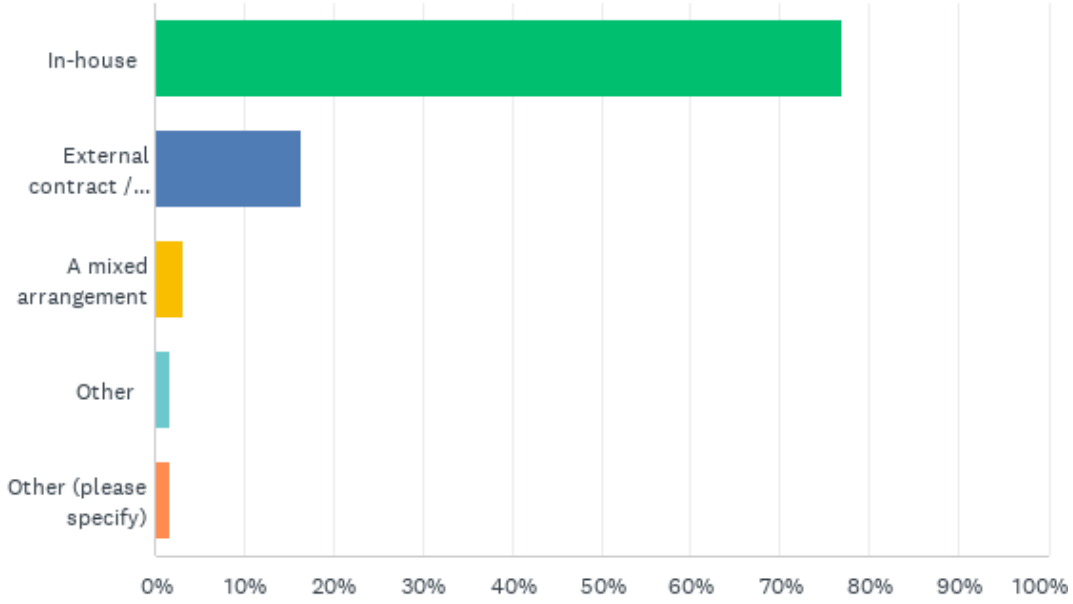
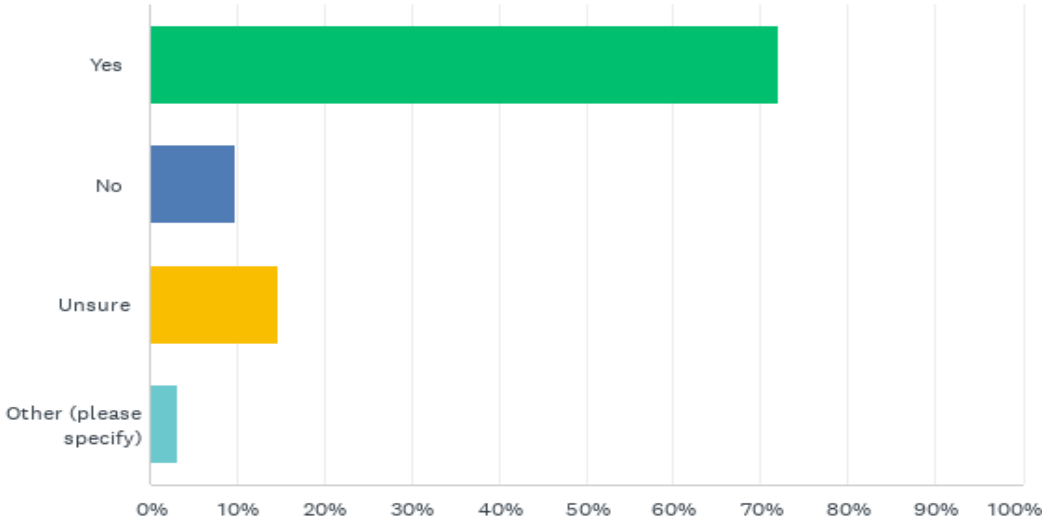


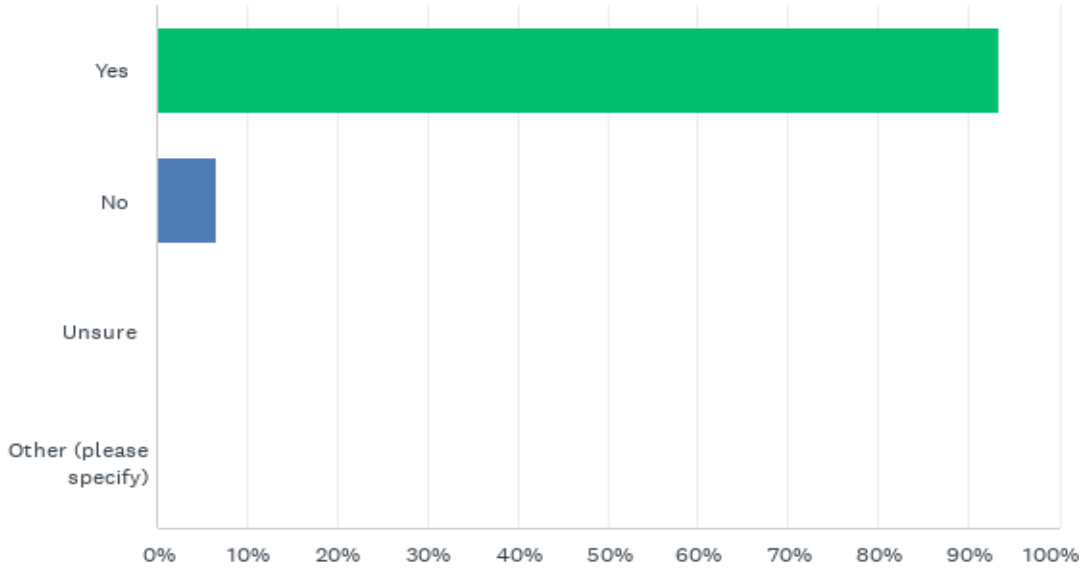
Over 77% of respondents used an in-house model for waste collection whilst just over 16% outsourced / used external contractors.

Has your council declared a climate emergency?



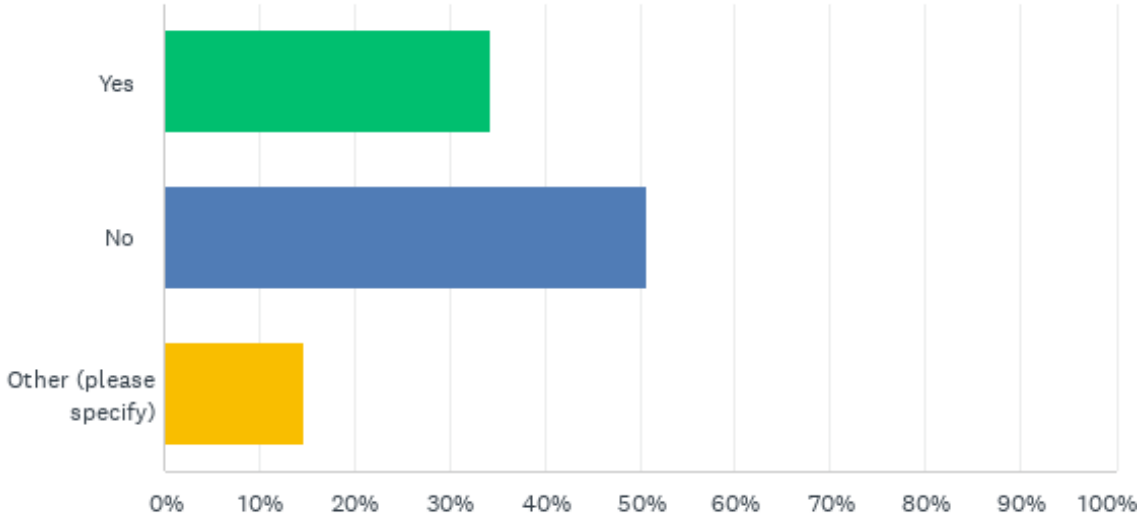
Over 72% of respondents mentioned that their authorities had declared a climate emergency against over 9% who had not.

Has your service been involved in any corporate or departmental discussions on a climate change or decarbonisation strategy?



Over 93% of respondents said that their service areas had been involved in climate change or decarbonisation strategy discussions. This suggests that strategic approaches are not being led by top down only decision-making. This is encouraging as it suggests a greater involvement of frontline services in determining strategy.

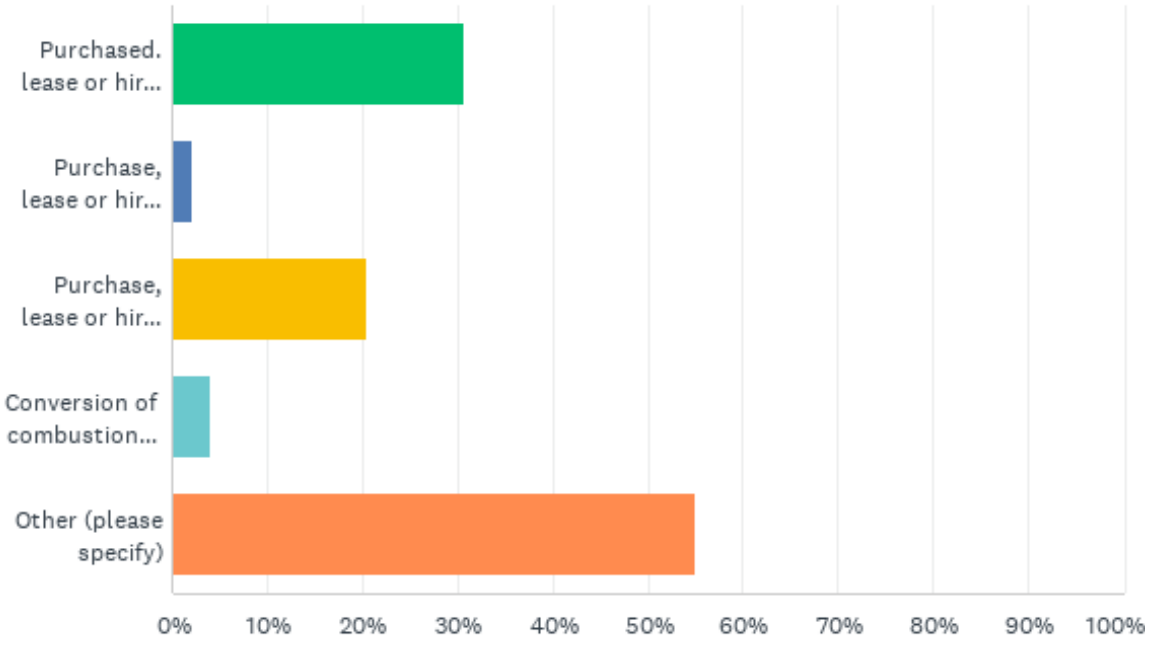
Have you set out a strategy to transition your refuse collection vehicles to a greener option?



Despite the fact a high percentage of authorities have declared a climate emergency — and fed into strategies discussions — over 50% had yet to set out specific strategies to transition their waste collection vehicles to a greener option. However, it is a sign of encouragement that near to a third of respondents are approaching this issue.

Have you adopted any of the following?

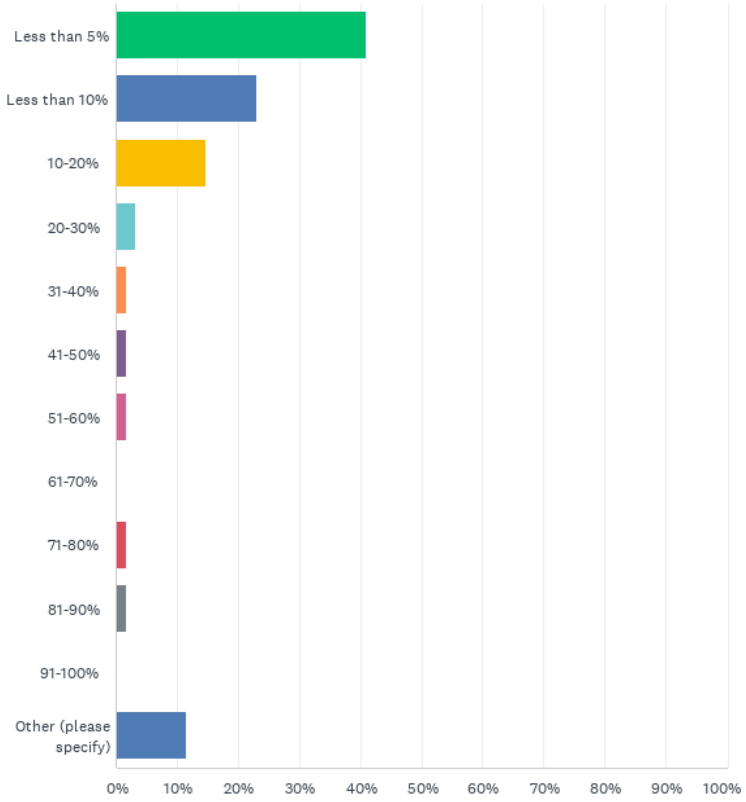
Questions were asked around various purchase and lease options with a range of responses:



ANSWER CHOICES	RESPONSES
Purchased. lease or hire of electric RCVs	27.78%
Purchase, lease or hire of hydrogen RCVs	3.70%
Purchase, lease or hire of biofuel / HVO	22.22%
Conversion of combustion engine RCVs to alternative source	3.70%
Other (please specify)	53.70%

Over 30% had purchased, leased or hired electric RCVs. 20% had purchased, leased or hired biofuel / HVO vehicles, with over 55% looking at various other greening initiatives. However, it appears that whilst these figures are encouraging, many of the lease and hire options represent short-term trials on new vehicles.

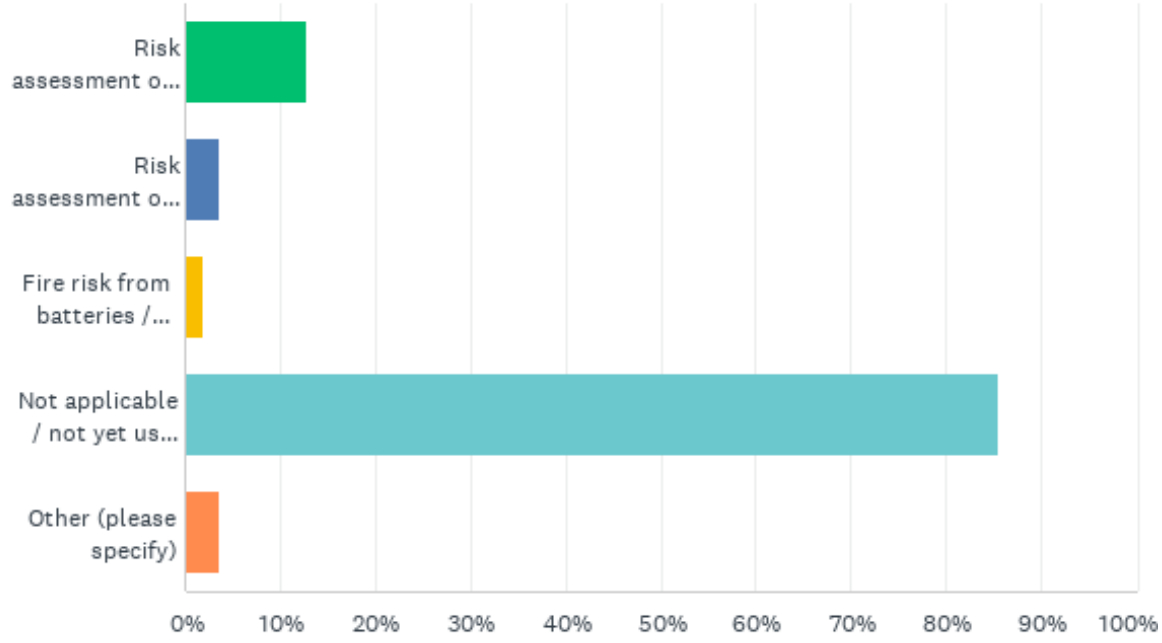
What percentage of your fleet do you regard as 'green fleet'?



ANSWER CHOICES	RESPONSES
Less than 5%	46.15%
Less than 10%	20.00%
10-20%	12.31%
20-30%	3.08%
31-40%	3.08%
41-50%	1.54%
51-60%	1.54%
61-70%	0.00%
71-80%	1.54%
81-90%	1.54%
91-100%	0.00%
Other (please specify)	10.77%

This question elicited a range of responses, but the highest percentage (over 40%) said they had less than 5%. This is a very low figure but perhaps reflects the longer-term decisions on vehicle purchases or long-term lease arrangements and local authorities adopting changes as fleet are due for renewal.

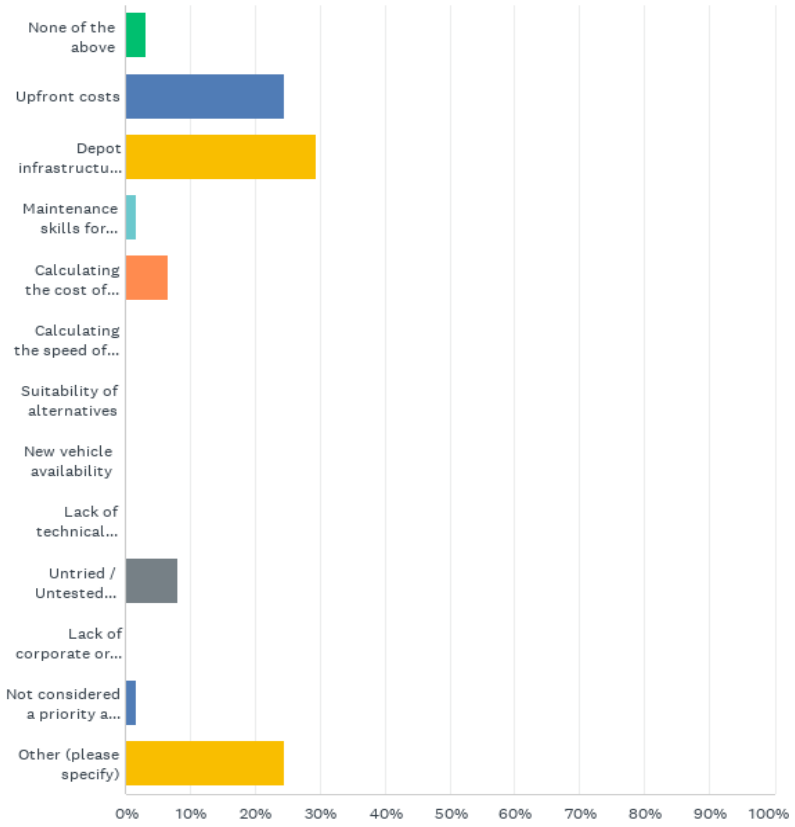
If you have converted some RCVs to electric fleet, have you risk assessed them as follows:



ANSWER CHOICES	RESPONSE
Risk assessment of low / no noise on moving vehicles / pedestrians	10.53%
Risk assessment on the need for ear protection from alarms on vehicles moving below 15mph	1.75%
Fire risk from batteries / thermal runaway	1.75%
Not applicable / not yet using EV RCVs	87.72%
Other (please specify)	3.51%

This question was not applicable to most responses as they stated they had not yet started using electric RCVs. However,12% had risk assessed against low / no noise on moving vehicles / pedestrians while just over 3% had assessed against the need for ear protection from alarms on vehicles moving below 15mph. These responses do not represent major obstacles but do suggest risk factors should be considered when transitioning to new RCVs.

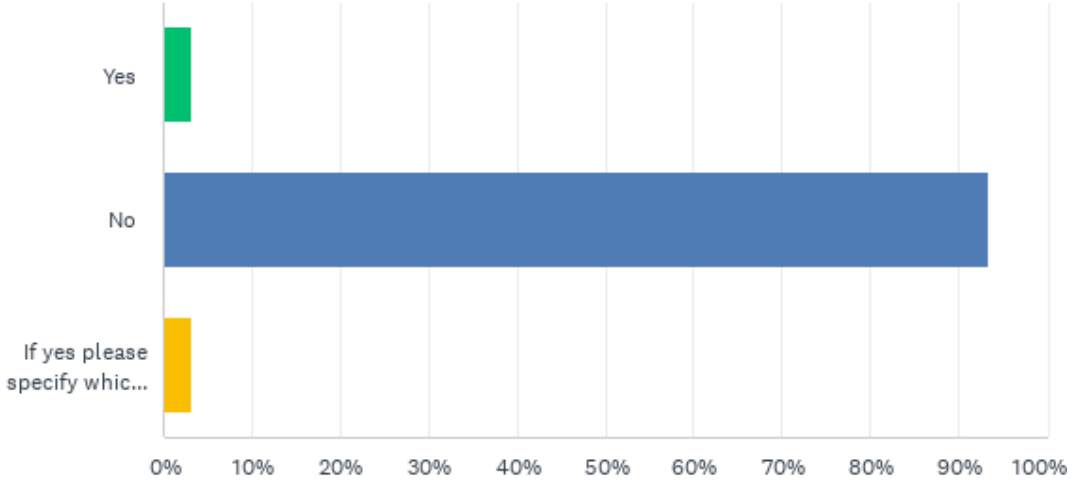
What issues have you encountered in looking to convert your fleet?



ANSWER CHOICES	RESPONSES
None of the above	7.69%
Upfront costs	26.15%
Depot infrastructure eg. lack of charging capacity	26.15%
Maintenance skills for green fleet	1.54%
Calculating the cost of change	4.62%
Calculating the speed of change	0.00%
Suitability of alternatives	3.08%
New vehicle availability	1.54%
Lack of technical information / specifications for alternative fleet	0.00%
Untried / Untested Alternative RCVs	7.69%
Lack of corporate or political support to make the changes	0.00%
Not considered a priority area for climate change work	0.00%
Other (please specify)	21.54%

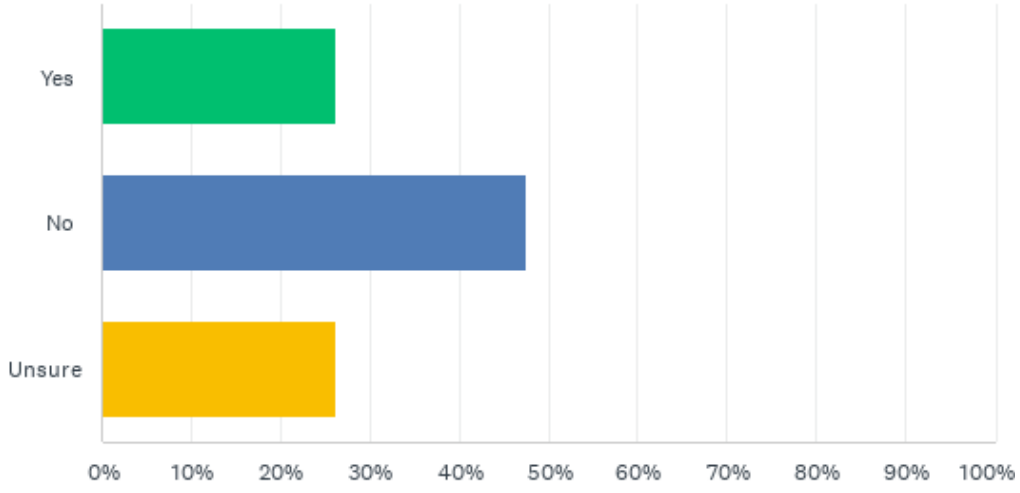
In terms of issues which have been encountered by authorities in their drive to convert fleet, whilst there are a range of issues, the biggest barriers appeared to be upfront costs (24%), and depot infrastructure e.g. lack of charging capacity, with 29% reporting this as an issue.

Have you used any modelling software to look at the cost of change or fleet transition issues?



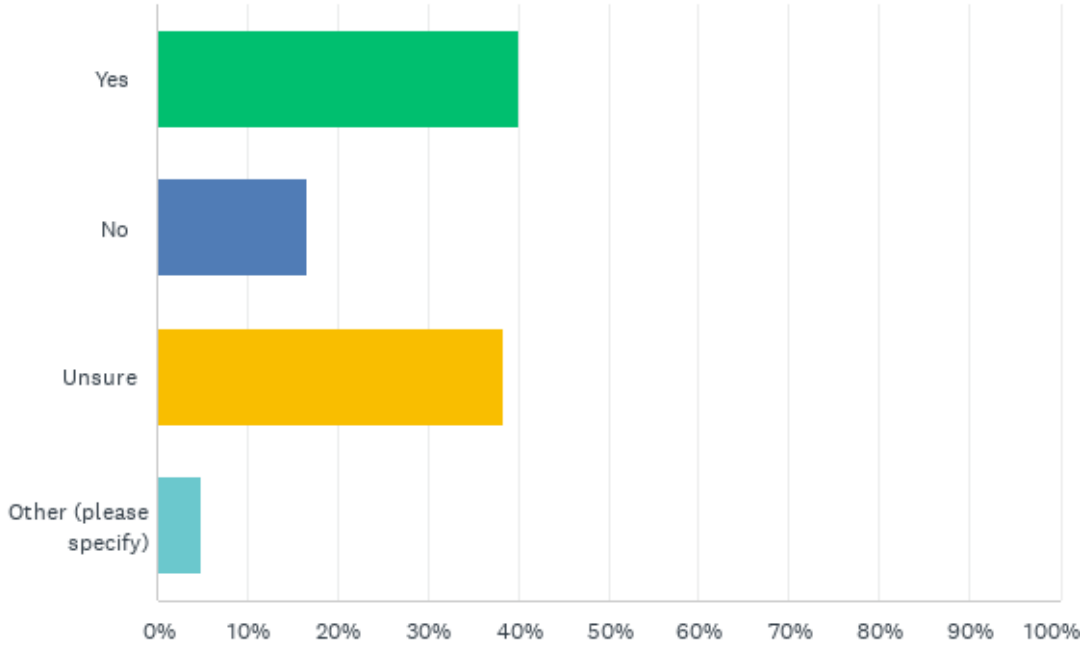
Most authorities (93%) had not used any software to look at the cost of change or fleet transition issues. Such software does exist and an exploration of products in the market places may assist in arriving at costing decisions.

Thinking about your local authority area are you currently, or will you in the near future be, the subject of a Clean Air Zone?



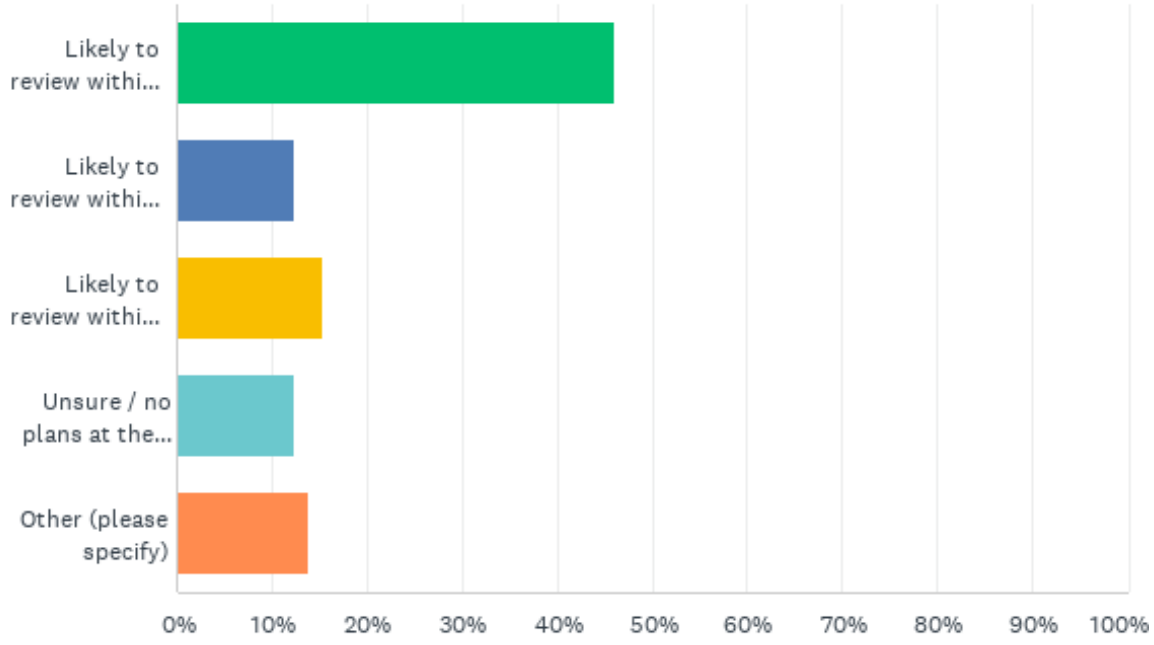
Over 47% of authorities surveyed stated that their areas would not be the subject of a Clean Air Zone (CAZ) while 26% stated they would. CAZs have experienced some recent controversy due to the inability of motorists such as van delivery drivers to access Euro 6 compliant second-hand vehicles

If you had a Clean Air Zone would your own council RCVs be caught within its remit? For example, crossing in and out of your local authority boundary / CAZ area in the delivery of the service?



40% of respondents would be caught within the remits of any new CAZ whilst 16% would not. This could have impacts in terms of fleet greening if there are potential extra charges or even exclusion for fleet from these zones in the future. The lack of consideration for public service delivery vehicles is perhaps an area that should be challenged since it will have a negative impact on service costs, at a time when investment is needed to bring all services up to clean-air standards.

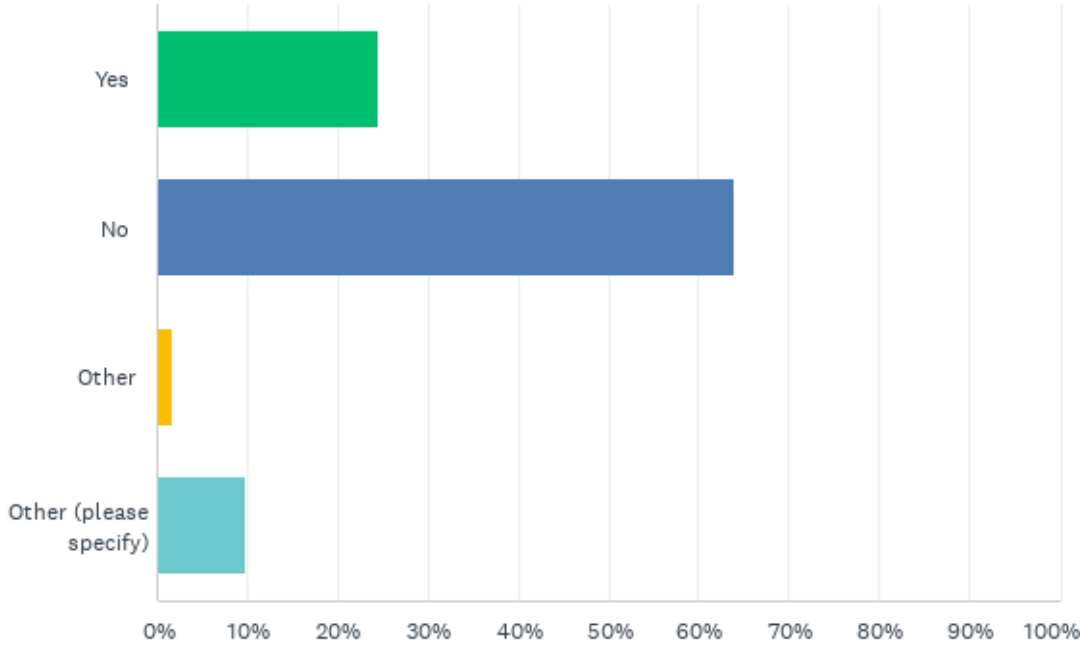
How likely are you to review your RCV fleet and when?



Likely to review within the next 12 months	42.62%
Likely to review within the next 2 years	13.11%
Likely to review within the next 3 years	16.39%
Unsure / no plans at the moment to review	11.48%
Other (please specify)	16.39%

Over 42% of respondents have stated they will be looking to review their RCV fleet within the next 12 months. However, this may not necessarily result in the immediate purchase or lease of greener fleet.

Do you feel you have a renewable energy infrastructure in place or at the planning stage to support your decarbonisation approach in your RCV fleet / depots?



Only 23% of respondents said they have renewable energy infrastructure in place or at the planning stage to support their decarbonisation approach in RCV fleet / depots while 63% do not have the infrastructure in place at the planning stage. This lag between infrastructure and ambitions to deliver a greener fleet is a serious matter.

4 Case studies

In line with the objectives of the research, case studies were taken from nine authorities to see what actions they have taken in relation to the use of EV fleet and alternative fuels in waste collection vehicles

The following case studies provide a range of examples of actions taken so far by APSE member councils:-

1. Islington Council
2. Dundee City Council
3. Ards and North Down Borough Council
4. Bournemouth, Christchurch and Poole Council
5. Nottingham City Council
6. Greater Cambridge Shared Waste (between South Cambridgeshire District Council and Cambridge City Council)
7. North Kesteven District Council
8. Eastleigh Borough Council

4.1 Islington Council

- ***Demography and geography***

Islington is one of the most densely populated local authority areas in the country, with 245,000 residents and 111,200 households. The Borough has small, compact streets, some of which have access issues.

- ***Service delivery model***

The Council runs an in-house waste collection service.

- ***Net zero targets***

In 2019, Islington Council declared a climate emergency. The Council is striving to achieve net zero carbon status by the year 2030. Creating a more environmentally friendly fleet is at the heart of this.

- ***Profile of council fleet***

Islington Council currently has approximately 530 vehicles in the fleet of which 80 are fully electric, comprising a mixture of cars, vans, cage tippers, sweepers, buses, and refuse collection vehicles (RCV) as well as e-bikes and e-cargo bikes.

Islington Council also boasts 30 hybrid vehicles, and two Compressed Natural Gas (CNG) vehicles.

- ***Approaches taken to green the fleet***

As part of the efforts to green its fleet, Islington Council is looking to replace its remaining Internal Combustion Engine (ICE) vehicles in favour of more sustainable alternatives.

- ***Introducing biofuels***

Islington Council is considering introducing biofuels such as hydrotreated vegetable oil (HVO) which they consider as a transition fuel whilst they continue to electrify more of the fleet, as HVO would reduce emissions considerably. Compared to white diesel, there is a premium to be paid for HVO so more discussions are taking place to see how quickly this fuel can be introduced to the fleet.

- ***Benefits of greening the fleet***

The introduction of electric vehicles to Islington's fleet, and the conversion or upcycling of existing diesel vehicles to electric, has brought huge benefits to the Council not only in reducing emissions but costs too, with the upcycled vehicle costing around £100k less than a brand-new E-RCV. It is estimated that once Islington Council has fully electrified its fleet, it will reduce emissions by 3,000 tonnes of CO2 per annum. The Council's 80 electric vehicles has already reduced emissions by around 300 tonnes over the last twelve months.

Carrying a greener fleet also brings cost benefits, with the Council's electric vehicles saving approximately 1,500 litres of fuel per month compared with petrol and diesel alternatives, equivalent to over £2,000 per month.

- ***Issues encountered in the process of greening fleet***

One of the main issues is the long lead-in times for new electric vehicles, with various delays occurring during the delivery process.

As more electric vehicles are added to the fleet, infrastructure must keep up and that is why the Council is having to work hard to install extra electric vehicle chargers across the Borough. Islington Council is working to boost its charging capacity, including the installation of rapid chargers to ensure vehicles which need to be 'double-shifted' can be deployed shortly after. Nevertheless, it is clear that more work must be done here to support the Borough's growing electric fleet, not only internally but externally.

Another major issue is that around half of Islington Council's van fleet-users do not live in Islington, and therefore need to commute into and out of the Borough. With this in mind, the Council is looking at the possibility of bringing electric vehicle chargers to staff's homes, with the energy used being automatically redirected to the Council with little input or fuss from staff. Other charging alternatives are also being considered where this is not possible.

- ***Next steps as part of the transition journey***

Islington Council is open to alternatives, such as HVO and hydrogen, but the main focus is on electrifying the fleet - rather than going down the alternative fuel route - as electric vehicles are now a more tried and tested mode of transport. Furthermore, the lack of infrastructure to support hydrogen vehicles as well as the potential cost has further encouraged the Council to electrify its fleet.

As part of its ambitious plans, the Council is also investigating the possibility of installing additional chargers at many more council sites, as well as potentially creating a "mini-superhub" where multiple vehicles can be charged at speed.

Clearly, had it not been for the huge challenges posed by the pandemic, Islington Council would be further along in its electrification journey. Nevertheless, Islington Council has already made huge progress and, with a large capital budget to further green its fleet over the next eight years, a more environmentally friendly future beckons.

4.2 Dundee City Council

- ***Demography and geography***

Dundee has a population of around 150,000 and approximately 77,400 households. A unique feature of the area is its topography, which is bowl shaped with narrow streets and high-rise buildings. This makes it difficult for the population to escape from transport related harmful emissions.

- ***Service delivery model***

Dundee Council runs an in-house waste collection service.

- ***Net zero targets***

As an authority, Dundee Council has declared a climate emergency with the whole city declared an 'air quality management zone' which all services needed to consider – from housing to transportation. Waste services were also involved in developing a

response to that declaration including decarbonisation plans.

- ***Profile of council fleet***

Dundee Council has 49 HGV's and has been running electric vehicles on the fleet for many years, including six electric bin lorries, two electric sweepers and two electric mini buses.

Currently, about 26% of their fleet is considered green. Whilst the cost of electric vehicles is considerably higher than a traditional diesel vehicle, the Council believes there is a balance to be made against the climate benefits, improvements to air quality and the carbon footprint of the fleet.

- ***Hydrogen vehicles***

Hydrogen is an area the Council has investigated. However, due to that fact the electric vehicles work very well for them, they are unlikely to take hydrogen vehicles further. Conversion is not an area they are considering to take forward due to associated issues.

- ***Approaches taken to green the fleet***

About £8 million pounds has been spent on vehicles and infrastructure in the last 11 years. The Council is also looking to convert around 220 of the Council's vans over to electric.

Dundee Council has taken a holistic approach, ensuring that departments and the corporate centre do not work in silos in terms of electrification projects; this includes looking at the entire city in terms of infrastructure power and cost required. The Council believes that communication has played a big part within all their projects and they will continue to make sure that members of the public, and their staff, are engaged with all the processes of change.

Looking at further infrastructure, they are exploring solar panels for one of their sites and even wind turbines with a view to powering the whole fleet with green energy over the next two years. The Council is also looking to reduce reliance on the grid by including more battery storage, reducing the overall cost.

- ***Partnership working***

Dundee Council has a long-term partnership with their manufacturers (Dennis Eagle) as part of an evolving transition. Long-standing relationships with manufacturers they believe is crucial for them, not only in terms of vehicle manufacturing but also creating the right infrastructure.

As a further initiative, they are also working with a company called Mina looking at home charging for staff.

- ***Issues encountered in the process of greening fleet***

At the start of the Council's journey over 10 years ago, Dundee Council encountered issues with the Distribution Network Operators (DNO). This has since been resolved and now there is a good relationship. Similarly, the procurement framework was time consuming but Dundee Council has now developed a flexible robust framework.

Another area of concern centred around a substation provision, whereby one company supplied the substation and another supplied the meters for the region. This created a complex application process and led to longer set up times by having to apply for a meter before infrastructure could be put in place.

- ***Next steps as part of the transition journey***

Dundee Council has about 60 electric vehicles on order and is hoping to have at least 35% of the fleet running as electric fleet before the end of the year.

On its next major projects, Dundee Council has added excessive capacity for electricity so that the hubs can be expanded with a thousand KVH substation, meaning it can expand three times what it has at the moment. The Scottish Government is helping with issues within the DNO around the selloff of extra electricity produced, and the Council is providing a holistic overview for the whole city, providing all the infrastructure for everyone.

With capital under pressure, Dundee Council is also looking to lease small vehicles and vans to free up capital for specialised vehicles, hoping to go to a 50-50 split between leased and owned. This will release capital to spend on bigger specialised HGVs which, for every vehicle changed over to an electric vehicle, a saving of 1% on the annual diesel costs for the whole council is realised. The Council is being bold in its undertaking, removing several diesel storage tankers and committing to electric vehicles going forward, showing the direction of travel it wishes to take.

4.3 Ards and North Down Borough Council

- ***Demography and geography***

Ards and North Down Borough Council (ANDBC) has around 130,000 households spread-out across a mostly rural area, sited upon a peninsula.

- ***Service delivery model***

ANDBC runs an in-house waste collection service.

- ***Climate emergency declaration***

ANDBC declared a climate emergency in 2019 and, as a service area, waste services has been involved in developing a response to that declaration – such as being part of a service level / decarbonisation plan.

- ***Profile of council fleet***

ANDBC has 26 RCVs on frontline operations and an additional eight 7.5. tonne vehicles.

The geographic size of the area with lots of country roads means ANDBC has to purchase vehicles that can work on these types of roads and distances.

- ***Approaches taken to green the fleet***

ANDBC currently has eight vehicles which have solar panels added to the roof. This is going some way to reducing the carbon footprint of those vehicles. ANDBC is one of the first authorities to fit solar panels to its RCV's in the UK. It costs around £3000 per truck to fit the solar panels.

On its smaller fleet, ANDBC has installed the Lightfoot System on around 60 vehicles. The Lightfoot System creates a series of lights in the dashboard which flashes for the driver to take their foot off the accelerator and keep it in the 'green' mode; this has led to about a 30% reduction in fuel usage in some vehicles using this method.[2]

At this point, ANDBC considers about 2% of its total fleet to be green.

- ***Introducing biofuels***

ANDBC had looked into HVO and Bio-oils for its fleet, and also explored the Crown Commercial Services (CCS) framework.[3] Unfortunately, companies on the CCS framework do not supply to Northern Ireland.

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[2] The Lightfoot System is a fleet management system which communicates directly with the driver via the in-cab dashboard device, providing visual and verbal feedback in real-time to encourage smoother driving. https://www.lightfoot.co.uk/fleet-management-products/ICE-vehicles

[3] CCS frameworks comprise common public sector requirements, a list of suppliers who have been evaluated as capable of delivering the requirements, and standard contract terms. https://www.crowncommercial.gov.uk/buy-and-supply/how-to-sell-through-ccs/#:~:text=CCS%20frameworks%20comprise%20common%20public,lots%20or%20an%20entire%20framework.

- ***Issues encountered in the process of greening fleet***

The Council had looked at engine conversions but its fleet manufacturers were not very keen on this. However, the Council intends to follow this up again in the future.

One of the biggest problems encountered was the purchase price, especially due to recent inflationary pressures –hydrogen vehicles being double the price of a normal RCV at around £450,000 against a regular RCV at about £200,000. ANDBC also found an issue with a lack of infrastructure and demonstration; electric vehicles tripping out every time they were attempted to be charged.

- ***An urgent need for investment in infrastructure***

ANDBC requires significant investment in its infrastructure, among other things, due to the age of its depot. The Council also lacks the resources to put in bidding for funding. ANDBC also has concerns around the range capacity of electric vehicles as the area is predominantly rural.

- ***Next steps as part of the transition journey***

As ANDBC shares a border with a member of the European Union (Eire), three of the local authorities are in a group with three of the local authorities in Ireland , where there is European funding available that is not directly available to it. However, ANDBC is working on a joint project with its European neighbours and has taken the lead in an ongoing project looking at alternative fuels. The Council is investigating electric vehicles further, but looking into the ethical sourcing of lithium for batteries, as well as looking at best practice from other authorities to see where the new technologies are working for them.

4.4 Bournemouth, Christchurch and Poole Council

- ***Demography and geography***

Bournemouth, Christchurch and Poole Council (BCP) is made up of Bournemouth, Christchurch and Poole which merged in 2019 to one local authority. The area covered is mostly urban with a small percentage being rural. BCP Council has a population of around 400,000 and approximately 187,000 residents.

- ***Service delivery model***

BCP Council runs an in-house waste collection service.

- ***Net zero target***

As an authority, BCP Council has declared a climate emergency hoping to be net

carbon zero by 2030. As a service area, waste has been involved in developing a response to that declaration – such as being part of a service level action plan/decarbonisation plan submitting a sustainable fleet replacement plan.

- **Reorganisation**

Merging rounds from three authorities has had its own set of challenges, including having to merge different waste disposal route methods. Having centralised depots has helped with efficiency and low milage and tonnage per mile.

- **Fleet Replacement Programme 2021 – 2024**

The Fleet Asset Replacement Programme, totalling £26.9 million, will see the replacement of core vehicles, plant and equipment as they come to the end of their economic life. A further £390,000 capital spend will also be considered to fund supporting infrastructure for ULEV purchases going forward.

Electric refuse vehicles are currently more expensive than their traditional diesel equivalents. However, reduced running costs over the lifespan of the vehicle is expected to offset this increase in investment. With 30 electric vehicles on fleet, which is now about 5% of their fleet, the target for the Council is for around 17% of the fleet to be electric after three years: totalling 104 electric vehicles. The Council believes the electric vehicle route is ultimately a better fit for them because of the geography of the local area; low milage, no hills and no fast roads, with the Council's fastest road having a 50 mph limit. BCP Council has also started working with E-flex. [4]

All the transition work is being completed in tandem with the Council's engineering team. BCP Council ensured its in-house electrical team was certified so it was capable of delivering installs at sites and depots. This has been helpful as the crew has the flexibility, know the sites and have access to the vehicles.

- **Charging points**

The Council is looking into charging points around its sites and the city. The Council is also exploring how it can provide home charging facilities.

[4] E-Flex is a "vehicle-to-grid charging project that re-thinks EV batteries as a two-way energy source. It uses special 'bi-directional' chargers that can not only charge an EV but also make smart use of unused electricity stored in the battery when the vehicle is stationary. This stored surplus energy can be used to power buildings or can be sold back into the grid when it's needed most." https://www.london.gov.uk/programmes-and-strategies/environment-and-climate-change/energy/e-flex-vehicle-grid-trial

- ***HVO as part of the transition process***

BCP Council has investigated different areas in regards to greening its fleet, looking at anything from compressed natural gas and liquefied petroleum gas, and the Council was one of the first in the country to trial used cooking oil. BCP Council has been trialing HVO for a couple of years and running four vehicles on it as part of its transition process.

The intention is to replace conventional diesel throughout the Council vehicle fleet with HVO, working with ZEMO accreditation.

- ***Issues encountered in the process of greening fleet***

The biggest hurdle for BCP Council is buying any vehicles, given shortages in supply. The cost of HVO is now also an issue alongside the lack of funding for infrastructure

For electric vans, BCP Council identified issues with the inability to charge them from home for operatives. So, in terms of replacing old fleet, this has caused a reluctance to replace with electric vehicles, hence why the Council has purchased a limited number for trial purpose. The Council's general approach is buying at least one electric vehicle amidst bulk vehicle replacements so it can compare performance and gain insight into what is best practice.

BCP Council also noted the risk of using unproven technologies and the need to regularly engage with, and secure assurances from, the larger manufacturers on ensuring their technology is sustainable.

- ***Next steps as part of the transition journey***

BCP Council continues to explore the various options as mentioned: electric, hydrogen, biofuel and conversion. For vehicles not due to be replaced for a years to come, BCP Council are exploring the idea of engine conversion. The Council does not necessarily have a fleet profile that fits any type of conversion that is cost effective but are not ruling it out.

The Council is looking at hydrogen, as well as energy from waste on site, as other possible fuel solutions for its fleet. To get the payback on the electric refuse fleet, the Council needs to do complete more mileage so there is a balance to be had.

The Council is exploring difficult areas like home charging, especially for staff who live in flats and take vehicles home. BCP is also looking at green procurement of the fleet as well as their final disposal with partners.

4.5 Nottingham City Council

- ***Demography and geography***

Nottingham City Council operates across a small, geographically urban area within the East Midlands. The Council has approximately 132,000 households with a population of 324,000 people.

- ***Net zero target***

The Council declared a climate emergency in 2021. The Council's carbon reduction action plan has the core aim of making the whole of Nottingham carbon neutral by 2028 (CN28).

- ***Profile of council fleet***

Currently, over 51% of the Council's whole fleet is fully electric, including 20 out of 52 RCVs.

- ***The decarbonisation journey***

The Council started its fleet decarbonisation journey in 2016. In addition to transitioning its fleet to electric vehicles (EVs), the Council has looked at other measures to reduce its carbon emissions. The Council has found telematic data to be particularly useful for analysing driver behaviours such as harsh braking and efficiency.

- ***Consideration of HVO and roof solar panels***

The use of HVO has been considered by Nottingham Council although this is not an area the Council wishes to pursue at this time. However, it has used an additive from Thomas Group that reduces diesel consumption by approximately 50,000 litres each year, while also investigating whether solar panels on its fleet of RCVs (electric and diesel) will offer a further saving on fuel. Furthermore, the Council is refurbing RCVs to extend lifespans as much as possible.

- ***Financial savings***

The financial savings generated from electrifying its fleet are estimated to be £920,000 this year, with potential to hit £1 million owing to the rising costs of diesel and maintenance.

- ***Issues encountered in the process of greening fleet***

Nottingham Council has managed to overcome most of the barriers faced. Many of the obstacles encountered at the start of that journey surrounded the availability of EVs.

However, there was also an issue with driver buy-in due to the newness of the technology – meaning drivers needed to be convinced, with EV advocates sought from the drivers who adopted the technology.

The Council also faced issues with maintenance as it couldn't find suitably trained mechanics in the market. As such, the Council dealt with this by training staff in-house and now has 12 mechanics trained to maintain EVs - including three master technicians.

Infrastructure was another challenge due to the limited availability of technology. For example, load balancing did not exist so the Council created its own load balancing system to manage charge point loads. Infrastructure still remains an issue though the Council is working through this with a gradual approach and believes the experience gained through carrying out its own charge point installation has helped its electrification journey.

- ***Next steps as part of the transition journey***

The Council is looking at various options to maximise the benefits of having an electric fleet including vehicle-to-grid and battery storage. Nottingham Council is also redoing calculations based on the changing prices of electricity and diesel. It is also producing documentation that will assess its fleet electrification journey up to 2028 and will say how much money, as well as charge points, it requires in each of the next six years to become a fully electric fleet. Finally, the Council has purchased two 250kva batteries as a battery storage solution and is looking at various ways it can utilise the combined 0.5MW batteries for its 243 EVs.

4.6 Greater Cambridge Shared Waste

- ***Service delivery model***

Greater Cambridge Shared Waste (GCSW) is a joint partnership between South Cambridgeshire District Council and Cambridge City Council. GCSW runs an in-house waste collection service.

- ***Demography and geography***

The service is an almost 50/50 split in terms of area being covered as rural and urban. Combined, there are approximately 125,000 households.

- ***Climate emergency targets***

Both South Cambridgeshire District Council and Cambridge City Council have declared a climate emergency and, as a service area, waste has played a significant role in

developing a response to that declaration. The climate plans for both authorities mirror each other and are aimed at reducing carbon emissions by 50% by 2025. GCSW has agreed to replace its diesel fleet with electric or alternate fuel versions. With such a large service area, there is a mixture of remote areas, long distances to the depot and tipping points.

- ***Profile of the fleet***

Currently, around 6% of the GCSW fleet is considered green. In terms of HGVs, the fleet has eleven standard vehicles on domestic residual and nine on organic waste (which also includes food waste) which are a mix of 26, 18 and 32-tonne lorries. In addition, there are twelve recycling trucks and two 17-tonne mini freighters that reach harder and more remote areas to access. There is also a 32-tonne vehicle with a crane that services the underground banks.

- ***Electric RCVs in operation***

GCSW have two electric RCVs in operation with a third ordered and awaiting delivery. A fourth electric vehicle has been purchased and will be operational in the next financial year. GCSW also has three electric fleet support vans which have replaced older, diesel ones,

GCSW has ordered one electric precinct sweeper for its streets service (serving South Cambridgeshire District Council).

- ***HVO trials***

GCSW has completed two trials using 10 refuse vehicles on HVO (Hydrotreated Vegetable Oil). The trials have shown that there is little or no difference in miles per gallon (some vehicles saw slightly improved mpg).

Funding is now secured to run a third of GCSW's RCV fleet on HVO next year (2023/24).

- ***Solar farm and battery storage facility***

Another initiative being investigated by GCSW is the building of an 800 KW solar farm and battery storage facility at the site. This should be able to produce and store enough power to run 20 of GCSW's electric RCVs. The GCSW depot has solar panels on the roof which provides enough power for the lighting and power sockets during the day; this includes charging three electric supervisor vans. A ground source heat pump is used to heat the building.

- ***Long vehicle delivery times***

GCSW has experienced difficulty in getting the electric vehicles into operation, with

initial lead delivery times ranging from six months to over 18 months. There has also been cost implications as electric vehicles – in addition to hydrogen and HVO vehicles - cost substantially more than the petrol and diesel equivalents. Both the initial outlay for the vehicles and infrastructure to charge/fuel them contribute to this.

- ***Problems with the grid***

Currently, the network connection from the grid is not sufficient to support the planned upgrades so GCSW only has enough power to charge three electric refuse collection vehicles on site, though there is an area off site where GCSW can charge a fourth RCV.

As it stands, GCSW unable to get any more power to the depot site unless there is a big upgrade to the network. If there was more availability on the network, GCSW would have purchased more electric vehicles.

The introduction of a solar farm and battery storage also involves several considerations such as choosing between vehicles with onboard chargers against those with external chargers: different vehicles need different types of charging infrastructure. Greater Cambridge Shared Waste has purchased electric vehicles from different manufactures to test out the benefits of each one in different areas.

- ***Next steps as part of the transition Journey***

Electric vehicles are part of the solution but are not considered to be the only answer. With technology improving all the time, things are sure to change. Due to the issues around capacity of the network for replacing fleet with electric vehicles, GCSW will continue to use diesel powered vehicles, running them on HVO/ alternatively derived fuels as there are no modifications needed to support this.

Further areas under investigation are for large electric road sweepers (for South Cambridgeshire District Council) and GCSW is currently working with manufacturers to supply demonstration vehicles. GSW has also introduced salary sacrifice schemes as an incentive for staff to buy an electric vehicle for personal use.

4.7 North Kesteven District Council

- ***Service delivery model***

A rural area, North Kesteven District Council (NKDC) services around 54,000 properties.

- ***Service delivery model***

North Kesteven District Council runs an in-house waste collection and workshop

maintenance service (with an outsourced street service).

- ***Two tier authority***

As a two-tier authority, the Council works with other collections and disposal authorities in the county to drive the future of waste collection and disposal.

- ***Climate emergency declaration***

As an authority, the Council declared a climate emergency in 2019. As a service area, waste has been involved in developing a response to that declaration – such as being part of a service level action plan / decarbonisation plan.

- ***Profile of the fleet***

The Council has an operator license for 35 RCV's and runs around 20 to 28 daily - including 17, 26 and 32 tonne vehicles on the fleet

- ***Which way? Deciding how to green the fleet***

At the moment, the Council's fleet is all still straight diesel. The big challenge the Council currently encounters is understanding which way to go in terms of fleet greening. The Council plans to work with the East Midlands Energy Hub to gain a fuller understand of how to electrify depots and get power into the site.

NKDC are investigating alternative fuels including electric vehicles. The Council had a road show with the Dennis Eagle eCollect in order to better understand the infrastructure and technology required. The Council is also investigating the possibility of solar panels on vehicles to feed into the alternator and reduce fuel consumption.

NKDC had been considering transitioning to HVO but, due to the recent surge in price, this move has been suspended for now.

- ***Replacing diesel with diesel***

Even though the Council has vehicles due for imminent replacement replaced, owing to the current uncertainties around which alternative fuel to take forward, NKDC will be replacing the diesel vehicles with like for like. Though the Council would have liked to replace its diesel vehicles with electric vehicles, due to infrastructure issues, it is not in a position to do so at this time.

- ***Continuing to investigate green alternatives***

NKDC are investigating all options before the ban on ICE vehicles comes into effect in 2035. The Council is hoping to run trials with a couple of electric vans to trial out real-life situations with the installation of two charging posts. The Council is also

considering the cost implications of an electric option and how to deal with the capital outlay and infrastructure.

4.8 Eastleigh Borough Council

- ***Demography and geography***

The Council has around 59,780 domestic properties with a population of around 135,620. With several semi-urban clusters and new builds, the local area is becoming more urban.

- ***Service delivery model***

Eastleigh Council runs an in-house waste collection service.

- ***Climate emergency***

Eastleigh Council declared a climate emergency in 2019 and, as a service area, neighborhoods and fleet has been involved in developing a response to that declaration – such as being part of a service level action plan / decarbonisation plan. This plan is important as the fleet services contribute about 15% of the Council's overall carbon emissions - the carbon footprint of its fleet in 2019 was the equivalent of 1,141 tons of carbon.

- ***Profile of the Council vehicles***

For its collection round, Eastleigh Council has around 33 vehicles (this involves weekly food, garden waste and trade waste), with 13 transit type vehicles on streets, 2 mechanical sweepers, 3 compact sweepers, 12 transit type vehicles for grounds maintenance, two tractors, 7 ride on mowers and various handheld equipment. All of the handheld equipment is electric or battery powered meaning hand on vibration and noise pollution is significantly reduced.

Currently about 5% of the fleet is what is considered green.

- ***Electric vehicles and equipment***

The Council has three electric vehicles which are due to arrive shortly – from Electra – which are on iconic chassis.

All of the Council's petrol operated equipment has now been switched to battery. The Council also has four electric Nissan Leaf vans operating with another four due for delivery. With three Electra vehicles on the iconic chassis delivered in August, the Council will enjoy a mix between HVO's and phasing out the petrol.

Eastleigh Council believes that if it moves to an electric fleet quicker, whilst the capital will be greater in the early years, the revenue costs will pay back quicker given current fuel costs. Even with the current high cost of energy, electric fleet is still cheaper and also links into the other areas the Council is investing in around sustainability such as investments in solar.

- ***Transition to HVO***

The whole of the Council fleet now runs on HVO and its carbon footprint now stands at 66.3 tonnes, which is a reduction of approximately 93%.

- ***Vehicle conversion***

The Council believes, from an embedded carbon point of view, "why buy new vehicles when you can just convert them?" as every new vehicle coming into the market has its own carbon footprint.

The Council has had conversations around hydrogen but are not looking to pursue this further at the moment owing to issues around sourcing fuel . As part of the Council's transition, there are plans for five of the Council's vehicles to be converted into electric in 2023 and another eight be converted in 2024, with the aim to have the whole fleet completely transitioned to electric of other greener fuel sources by 2028.

The Council 's 5 year plan involves moving the percentage of the green fleet from 5% to 50% by 2025, and to 100% by 2028. In terms of the Council's capital cost for investments in green fleet, it has gone from two million a year to four million.

- ***Training***

The Council has trained all of its workshop staff to work with electric vehicles. The Council has established staff working groups so as to bring forward ideas around transition to a greener fleet. Eastleigh Council has an ageing workforce so is working on recruiting new staff.

- ***Issues encountered in the process of greening fleet***

HVO has become significantly more popular in the last 12 months – now more expensive than diesel – so the Council has had to absorb the extra costs. From a revenue point of view there is no real savings in moving back to diesel but this adds further weight to the arguments in favour of moving to electric vehicles quicker.

Eastleigh Council has also experienced issues getting the infrastructure into the depots for electric vehicles, which is one of the reasons why it is opting for a phased approach

in its transition journey.

- ***Next step for you as part of your transition Journey***

As per its five-year plan, the next steps for Eastleigh Council is mainly around getting build slots for the greener vehicles it requires. The Council is looking to place orders for those vehicles by the end of this calendar year because the new infrastructure will come online around July 2024. Therefore, the Council is giving itself at least 18 months to get those vehicles in order due to lead times going from 6 mouths to 12 months.

5 Conclusion – APSE Comment

With everyone playing their part in trying to meet the challenges of reducing emissions, many local authorities have declared climate emergencies and have been looking into various ways and actions which can be taken to decarbonise council services. One of the ways in which this has been implemented is around the greening of waste collection vehicles and other council fleet by investigating the use of electric fleet and alternative fuels.

APSE looked at several local authorities and from the survey and case studies, it can be observed that despite the best intensions and the willingness for councils to work on greening their fleet, and despite progress made, councils have faced a wide range of challenges, with many of them experiencing similar issues.

The main issues which emerged from the case studies were around the costs of acquiring greener fleet (the cost of an electric vehicle, or one which runs on attentive fuel vs an ICE engine is considerably higher) as well the set-up costs for the infrastructure and the availability of the infrastructure itself. Another recent issue around cost involves a sharp rise in energy costs. This has had an adverse impact on those already running electric fleet, with those who were considering this as an option now looking to reconsider.

For those considering greener fuel alternatives like HVO, concerns were raised to ensure the fuel was sourced ethically and had ZEMO accreditation. There have also been issues around the lead times and availability for electric and greener vehicles ranging from between six to eighteen months. Another theme which emerged the availability of skilled staff required to run and maintain a greener fleet.

Also, depending on the topography of the authority, those considering electric fleet have had to take into consideration the number of miles that would need to be covered, with range anxiety being a serious issue.

Despite all the issues raised, councils continue to push forward with greening of their fleet to meet the targets of their climate emergency declarations as well as the Government's 2030 ban on the sale of ICE vehicles.

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