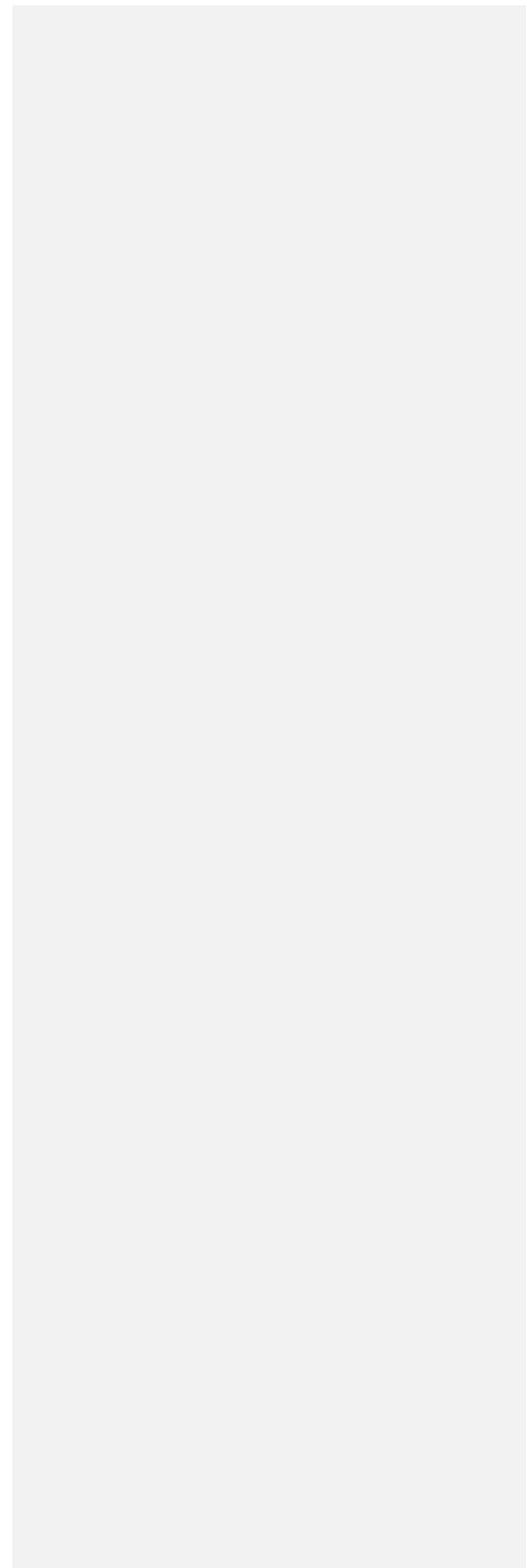


Ultra-low Emission Vehicles Strategy Aberdeen City and Aberdeenshire

Deliverable No.:	
Project Acronym:	
Full Title: Ultra Low Emission Vehicles Strategy Aberdeen City and Aberdeenshire	
Grant Agreement No.:	
Workpackage/Measure No.:	
Workpackage/ Measure Title: The Freight Distribution Hub	
Responsible Author(s): Robert Seale	
Responsible Co-Author(s): Kelly Wiltshire	
Date:	November 2020
Status:	Draft / Final
Dissemination level:	Public





Abstract

The purpose of this document is to create a long-term strategy for the adoption of ultra-low emission vehicles (ULEVs¹) across the North East of Scotland.

Objectives

- a. Ensure good infrastructure is in place to make travelling in ULEVs and recharging / refuelling simple across the north east of Scotland, including establishing strong links between charging points / hydrogen refuelling points and key sites
- b. Increase the adoption of ultra-low emission vehicles in public transport
- c. Ensure that ULEVs are the norm for the vast majority of private car owners by 2040

¹ The term ultra-low emission vehicle is most often used to refer to battery powered electric vehicles and hydrogen fuel cells

- d. Help to deliver additional cost and emissions savings through economies of scale, partnership working, smart charging and other demand responsive systems
- e. Ensure that people have the right information to make informed choices about switching to ULEVs and signposting to information on grants and loans.

Project Partners

Organisation	Country	Abbreviation
Nestrans	UK	ABZ

Document History

Date	Person	Action	Status	Diss. Level
19/07/2020	Robert Seale	Initial Draft	Complete	
19/07/2020	Kelly Wiltshire, Jenny Anderson, Paul Finch and Rab Dickson	Initial Feedback Provided	Complete	
21/07/2020	Chris Menzies	Initial Feedback Provided	Complete	
01/09/2020	Alan Simpson	Initial Feedback Provided	Complete	
08/09/2020	Robert Seale	Second Draft	Ongoing	
November 2020	Project Team	Final Draft circulated		
December 2020		Final draft published		

Dissemination Level: PC = Project Coordinator, SC=Site Coordinator, TC=Technical Coordinator, EM=Evaluation Manager.

Table of Contents

1. Executive Summary

2. Introduction

3. Background

- Rationale for Ultra Low Emission Vehicles (ULEV)
- Covid 19

4. The Policy Context

- UK Government
- Scottish Government
- The North East of Scotland
- Aberdeen City Council
- Aberdeenshire Council

5. The Current Situation and Future Forecasts

- International Trends and Policy
- UK Infrastructure and Market for ULEVs
- Connected and Automated Vehicles

6. Key challenges for growth in the North East and potential options

7. Recommendations

- Action Plan

8. Monitoring

9. Appendices

- Appendix 1 - Summary of Air Quality Objectives in Scotland
- Appendix 2 - Sustainable Transport Hierarchy
- Appendix 3 - Transport Hierarchy During Covid-19

1. Executive Summary

The different advantages of electric vehicles and hydrogen vehicles mean that they both have a role in contributing towards greenhouse gas (GHG) reduction targets, air quality targets and sustainable transport targets. For example, battery electric vehicles have higher overall fuel efficiency and are therefore advantageous for short distances and in light vehicles while hydrogen stores energy in less weight so fuel cells are suitable for vehicles with heavy loads while also offering the benefit of faster refuelling.

Since transport accounts for 37% of total Scottish greenhouse gas emissions (GHGs) and road transport accounts for 68% of total transport GHGs, ULEVs are an essential part of achieving the Climate Change Act (Scotland) 2019's target to reduce greenhouse gas emissions to net

zero by 2045. <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/chapter-13-environment-and-emissions>

ULEVs are crucial in achieving targets from the north east’s draft Regional Transport Strategy (RTS 2040). For example, achieving the draft Regional Transport Strategy (RTS) to 2040’s priority for 50 / 50 modal split between sustainable transport and individual car use while contributing to emission reductions in transport will entail achieving a significant increase in ULEV vehicles as a proportion of individual-use vehicles as well as a modal shift to other types of transport.

The five objectives for this strategy outline opportunities to contribute to the draft RTS 2040 and Scottish Government transport targets by:

- Ensuring people have the right information to make informed choices about switching to ULEVs;
- Ensuring good infrastructure is in place to make travelling in ULEVs and recharging / refuelling simple across the north east including establishing strong links between charging points / hydrogen refuelling points and key sites;
- Promoting the adoption of ultra-low emission vehicles in public transport;
- Helping to deliver additional cost and emissions savings through smart charging, such as monitoring, managing, and restricting charging devices to optimise energy consumption, and other demand response systems; and
- Ensuring that ULEVs are the norm for the vast majority of private car owners by 2040.

An action plan has been composed to achieve the strategy’s objectives.

Action	Owner	Date	Comments
1. Keep up to date with ongoing changes to national and local policies and strategies.	Nestrans	Ongoing	
2. Promote the use and expansion of ultra-low emission vehicles for public and private vehicles through funding, support and bespoke events.	Nestrans / local authorities and Transport Scotland / Energy Savings Trust / Getabout	Ongoing	

3. Source case studies to give examples of where a business, family, household and/or individual has moved to using a ULEV.	Nestrans / local authorities	Ongoing	
4. Work with local authorities and other stakeholders to ensure that there is charging/fuelling infrastructure available on key routes, at key destinations and in new developments.	Nestrans / local authorities and Transport Scotland	End 2022	
5. Develop an implementation plan on installing and promoting charging and fuelling infrastructure in conjunction with local authorities and key stakeholders.	Nestrans / local authorities	Winter 2020/21	
6. Work with local authorities, energy providers and key stakeholders to promote cost and emissions savings through smart charging and other demand response systems.	Nestrans / local authorities	Ongoing	
7. Amend strategy as appropriate to changing circumstances.	Nestrans	Ongoing	

2. Introduction

Most ULEVs use electricity or hydrogen to power an electric motor. Hybrid vehicles use an electric-powered motor that is backed-up by an internal combustion engine and therefore tend not to be classified as ULEVs². Hydrogen vehicles are refuelled at specific stations in a similar way to petrol or diesel-based vehicles while electricity-fuelled vehicles (EVs) use batteries that are typically charged using a dedicated charge-point. While electric vehicles can offer the convenience of home charging, hydrogen vehicles' refuelling is less time consuming than charging EVs.

² For more information see - Union of Concerned Scientists (2014) *The Importance of both Battery Electric and Hydrogen Fuel Cell Electric Vehicles*
https://www.jstor.org/stable/resrep17282?seq=1#metadata_info_tab_contents accessed 09/09/2020

The three main types of EV chargers are slow, fast and rapid. Each type represents a range of the power outputs measured in kilowatts (kW) and, consequently, the charging speed.³ Slow chargers, which are common as home chargers, are likely to take around eight hours to fully charge a vehicle while rapid chargers can charge a vehicle in around 30 minutes to an hour and are therefore more practical along key routes and at petrol stations/service stations. Most EV charging point network providers offer access via through a radio-frequency identification (RFID) card or an app or contactless bank card.

With a typical range of over 200 miles, electric vehicles are quickly overcoming concerns about range so there is a major opportunity for the north east to build on this momentum by supporting electric charging points at key sites.

While it is already cheaper to run an electric vehicle in the UK than a fossil-fuel powered vehicle, the upfront capital costs of electric vehicles and limited availability in the second-hand market still present a barrier to many people. Despite this barrier, the global trend of increasing adoption of and investment in low emission vehicles indicate that electric vehicles and hydrogen vehicles are likely to benefit from a greater economy of scale and decreasing upfront costs throughout the 2020s and beyond.

Rationale for Ultra Low Emission Vehicles

The damage that air pollution can cause to people's health is widely reported. The Royal College of Physicians report that exposure to outdoor air pollution is attributable to 40,000 deaths per year in the UK and is linked to cancer, stroke and heart disease, asthma, obesity, COPD, diabetes, and dementia.⁴ Additionally, the British Heart Foundation estimate that particulate matter air pollution could be attributed to 160,000 heart and circulatory disease deaths over the next decade in the UK⁵. This also has implications for productivity with air pollution being implicated in an estimated 6 million sick days per year in the UK.⁶ Noise from internal combustion engine (ICE) vehicles has also been identified as a risk factor for

³ Further detail of types of chargers within these ranges can be found at <https://www.zap-map.com/charge-points/connectors-speeds/>

⁴ Royal College of Physicians (2018) *Reducing air pollution in the UK: Progress report 2018*

⁵ British Heart Foundation 2020 <https://www.bhf.org.uk/what-we-do/news-from-the-bhf/news-archive/2020/january/heart-and-circulatory-deaths-related-to-air-pollution-could-exceed-160000-over-next-decade> Accessed 11/03/2020

⁶ Royal College of Physicians (2016), *Every breath we take: the lifelong impact of air pollution*. Report of a working party, London: RCP

cardiovascular and metabolic disease⁷ while the estimated total social cost of air pollution is £22.6 billion per year.⁸

Furthermore, 2019 ended with a global average temperature 1.1 °C above pre-industrial levels⁹ while 19 of the 20 hottest years since modern record keeping began in 1880 have registered in the 21st century.¹⁰ The increase in global average temperatures has led to more severe and frequent floods, droughts and dangerous heatwaves around the world.¹¹

Given that transport is one of the biggest contributors to air pollution and greenhouse gas emissions (GHG),¹² accounting for 37% of Scotland emissions¹³, targets to decarbonise the economy and improve air quality entail making changes to how people travel. Ultra-low emission vehicles have been identified as a means of reducing GHGs and improving air quality due to their lower emissions than internal combustion engine (ICE) powered vehicles¹⁴.

However, despite offering environmental advantages, ULEVs still contribute to environmental issues through the GHG emission-intensive manufacturing stage and particle emissions from tyres and brakes¹⁵. ULEVs also contribute to road safety issues and congestion to the same extent as ICE vehicles. Accordingly, active travel, such as walking, wheeling and cycling, have advantages over ULEVs from a health and environmental point of view while public transport is advantageous from an environmental point of view. This strategy has therefore been developed with reference to these caveats and reflects the priorities set out in the sustainable transport hierarchy (see Appendix 2).

Given that the north east of Scotland covers a large rural area where travel patterns do not always align with core transport corridors, there is significant potential for ULEVs to contribute to

⁷ Münzel, T., Rao, X., Brook, J., Brook, R. D., Schmidt, F. P., Gori, T., Sørensen, M. (2017). *Environmental stressors and cardio-metabolic disease: part I—epidemiologic evidence supporting a role for noise and air pollution and effects of mitigation strategies*. European Heart Journal.

⁸ Royal College of Physicians (2018) *Reducing air pollution in the UK: Progress report 2018*

⁹ World Meteorological Organisation (2020) *Statement on the State of the Global Climate in 2019*

¹⁰ Nasa (2020) <https://climate.nasa.gov/vital-signs/global-temperature/> Accessed 25/05/2020

¹¹ World Meteorological Organisation (2020) *Statement on the State of the Global Climate in 2019*

¹² Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 11/03/2020

¹³ Carbon Account for Transport, No.10, 2018, Scottish Government

¹⁴ Carmichael, R. (2019) *Behaviour change, public engagement and Net Zero. A report for the Committee on Climate Change*. Available at <https://www.theccc.org.uk/publications/>

and <http://www.imperial.ac.uk/icept/publications/>

¹⁵ Carmichael, R. (2019) *Behaviour change, public engagement and Net Zero. A report for the Committee on Climate Change*. Available at <https://www.theccc.org.uk/publications/>

and <http://www.imperial.ac.uk/icept/publications/>

emissions reduction and air quality goals, particularly where public transport and active transport are not seen as viable.

While plug-in hybrids can offer advantages over purely fossil fuel-based vehicles, recent evidence suggests that actual emissions from plug-in hybrids are significantly higher than levels recorded in their testing meaning that emissions levels are significantly higher than those claimed by manufacturers.¹⁶ Accordingly, full electric or hydrogen vehicles remain preferable from an environmental point of view to plug-in hybrids.

Covid 19

While the full implications for transport behaviour are not yet clear, early indications suggest likely long-term changes in travel behaviour, including an intention to walk and cycle more beyond the lockdown and a belief that virtual meetings will replace some if not most, business trips and meetings.²¹ Surveys also note that a majority of people support improvements to air quality following the pandemic,²² however, they also suggest that 10-20% of people would be worried about using public transport²³. This could translate into an increase in people driving as lockdown measures are phased out, especially as car sharing is also not encouraged outside of households to try and stop the spread of Covid-19. Despite this, the same survey indicated increased interest in buying an EV vehicle of 20-30%.

During the pandemic there are also implications for the day-to-day use of public electric vehicles chargers and hydrogen refuelling points since they require washing or sanitising hands before and after the use of charge or refuelling points, particularly where they require use of a screen and button.²⁴

The Covid-19 pandemic has resulted in significant disruption to global and local transport. Demand for public transport fell by between 85% and 95% in Scotland during the first lockdown in early 2020¹⁷, airlines entered administration and many more people have been walking, cycling and working from home.

In addition to the human and health cost, the pandemic has caused significant economic damage and a significant reduction in traffic on UK roads during periods of restrictions to slow the spread of the virus. Despite this damage, there is also an indication of improvements in air quality, particularly in busy urban areas. An approximate decrease in NO₂ of 40% was recorded in June 2020 and has been linked with an improvement in the symptoms of those with lung conditions¹⁸.

¹⁶ Transport and the Environment (2020) *The Plug-in Hybrid con On the 5th anniversary of dieselgate carmakers new cheats exposed*
https://www.transportenvironment.org/sites/te/files/publications/2020_09_New_evidence_PHEV_emissions.pdf
accessed 17/09/2020

¹⁷ Transport for Scotland 2020 <https://www.transport.gov.scot/coronavirus-covid-19/transport-transition-plan/>
accessed 28/05/2020

¹⁸ British Lung Foundation (2020) <https://www.blf.org.uk/media-centre/press-releases/nearly-2-million-people-with-lung-conditions-notice-improved-symptoms-as>

Air quality monitoring stations in Aberdeen City have shown a decrease in NO₂ levels from the previous year, while travel monitoring data has shown a significant increase in cycle counts and a decrease in traffic relative to 2019 levels.¹⁹ A series of transport initiatives have emerged in response to the crisis around the world²⁰ with the Scottish Government launching a Spaces for People fund to make essential travel and exercise safer.

Flexible working and home working combined with the increase in active travel may push down demand for car use, but concern of using public transport, car sharing and the need to physical distance may push it up. The cumulative long-term impacts of Covid-19 on the travel network therefore remain unclear.

Nestrans is currently undertaking surveys every four weeks to establish a clearer picture of the impact on Covid-19 on travel and transport. The result of these surveys can be found [here](#).

3. The Policy Context

UK Government

In June 2019, the UK became the world's first major economic power to pass a legally binding target to reduce GHGs to net zero by 2050, thus going beyond the previous target of at least an 80% reduction from 1990 levels by this date.²¹ Since surface transport is the highest emitting sector of the UK economy (accounting for 27% of all emissions) and the majority of surface transport's emissions are from ICE vehicles, a transition away from these vehicles constitutes an indispensable part of meeting the UK's GHG emission targets.²² This fits into a trend in numerous European countries where CO₂ emissions from transport emissions have not decreased nearly as much as emission from other sectors.²³

The UK Government's Road to Zero Strategy includes a legally-binding 15-year target to more than double low-carbon fuels' use and for at least 7% of road transport fuel to be low-carbon by 2032. Additionally, in the run up to the next Conference of the Parties (COP) meeting in Glasgow (which has been postponed to November 2021), the UK Government has brought forward a ban on selling new petrol, diesel or hybrid cars from 2040 to 2035. Moreover, the UK Government has integrated clean growth into its Industrial Strategy and announced £142.9m

¹⁹ C-19 URBAN REALM TASKFORCE, TRANSPORT DATA – WEEKLY REPORT, 29/06/2020 TO 05/07/2020

²⁰ Mott Macdonald (2020) *Covid-19 and the future of transport: predicting and navigating uncertainty*

²¹ <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>
Accessed on 07/02/2020 at 10.46

²² Department for Transport (2019) Future of mobility: urban strategy. [online]. London: Department for Transport. Available from:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786654/future-of-mobility-strategy.pdf

²³ International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro

https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf
Accessed 02/06/2020

funding towards for research and development to combat water and air pollution, and to tackle climate change.²⁴

In November 2020, the UK Government once again brought forward the ban on new cars and vans powered wholly by petrol and diesel to 2030, putting the UK behind only Norway, whose fossil fuel vehicle abolition date is 2025. This announcement would be delivered by £4bn of investment, including £1.3bn in electric vehicle charging points and £582m grants to help people to make the transition to EVs²⁵. At the time of writing, UK Government initiatives to support the early market for ULEVs include:

- A grant of up to £3,000 towards a new plug-in vehicle²⁶
- A grant of up to £350 towards home-installation of an electric charger²⁷
- A fund to develop rapid charging points for electric vehicles and to more than double the number of rapid charge points across the UK by 2024²⁸
- Commitment to a consultation on requiring charge points to be built into all new homes with a parking space.

Air Pollution

Two of the most significant pollutants to health that are linked to transport are particulate matter and nitrogen dioxide (NO₂). The limit for fine particle matter of under 2.5 microns in diameter (PM_{2.5}) is 25 micrograms of ultra-fine particles per cubic metre (µg/m³) as an annual average in the EU. However, the World Health Organisation's (WHO) limits are significantly more stringent at 10µg/m³ as an annual average. It is important to note that there are health impacts even at very low concentrations, which suggests that there is no safe level of PM_{2.5}²⁹. This is particularly significant since smaller particulate matter (PM_{2.5}) are considered to be the most damaging pollutant to human health³⁰ and approximately 62% of monitored roads in UK cities exceed the 10µg/m³ WHO guidelines in 2018.³¹ While the UK adheres to its own air standards for all pollutants except NO₂, it aims to meet the WHO's air quality standards³².

²⁴ UK Government (2019) 'Over £500m new investment in green technologies for a cleaner and healthier future' <https://www.gov.uk/government/news/over-500m-new-investment-in-green-technologies-for-a-cleaner-and-healthier-future> Accessed on 06/02/2020

²⁵ BBC (2020) <https://www.bbc.co.uk/news/science-environment-54981425> retrieved 18/11/2020

²⁶ UK Government (2020) <https://www.gov.uk/plug-in-car-van-grants> accessed 05/05/2020

²⁷ See <https://www.edfenergy.com/electric-cars/government-grants>

²⁸ HM Treasury (2018) 'Management of £400 million electric vehicles charge fund opens to bidders' <https://www.gov.uk/government/news/management-of-400-million-electric-vehicles-charge-fund-opens-to-bidders> Accessed on 07/02/2020

²⁹ World Health Organisation (2018) *Ambient (outdoor) air pollution* [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) accessed on 12/03/2020

³⁰ World Health Organisation (2018) *Ambient (outdoor) air pollution* [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) accessed on 12/03/2020

³¹ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 12/03/2020

³² DEFRA (2019) *Assessing progress towards WHO guideline levels of PM_{2.5} in the UK* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/825472/air-quality-who-pm25-report.pdf accessed on 12/03/2020

Scottish Government

The Scottish Government declared a global climate emergency in May 2019 and passed the The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 to accelerate Scotland's GHG reduction targets to net-zero by 2045 at the latest, with interim targets for GHG reductions of at least 75% by 2030 and 90% by 2040. Given that transport accounts for 37% of Scotland emissions³³, targets to decarbonise the economy and improve air quality entail making changes to how people travel.

In 2013, Transport Scotland set out a long-term vision to advance the widespread adoption of electric vehicles in The Switched On Scotland Roadmap. It anticipated that the EV market would develop in three phases: launch, growth and take-off. The second phase of the Roadmap was published in 2017 and included a 10-point action plan to build upon the 37 actions from the initial report.

The Scottish Government's National Transport Strategy (NTS), published in February 2019, notes that the registrations of ULEVs in Scotland have increased considerably.³⁴ While the NTS recognises the opportunities for emissions reductions that ULEVs can offer compared to ICE vehicles, the strategy stresses that active travel and public transport usage are more desirable due to individual ULEV ownership contributions towards congestion, road safety issues, poor air quality through particulate emissions from brakes and tyres in addition to the high levels of GHG emissions associated with their manufacturing.

Consequently, maximising the potential benefits of ULEV vehicles will entail supporting a greater adoption of such vehicles in conjunction with the development of smart mobility infrastructure and services that could reduce dependency on individual car ownership, increase the utilisation rates of vehicles and to allow greater efficiency in the use of urban space such as by reducing demand for parking spaces.³⁵

In addition to passenger-based travel, there is a need for significant freight reform to meet the Scottish Government's emission reduction targets. However, a caveat with this is the fact that electrification potential in freight and zero-emission heavy goods vehicles is not yet sufficiently mature and will require further research and innovation.

The Scottish Government aims to decarbonise Scotland's rail passenger services by 2035 and has published its Clean Air Strategy (2015) which follows the stricter WHO guideline for PM2.5 than the UK Government's target at 10 µg/m³. Other air pollutant objectives in Scotland are outlined in Appendix 1.

³³ Carbon Account for Transport, No.10, 2018, Scottish Government

³⁴ Scottish Government (2020) Scottish Transport Statistics No 37, 2018, Table 13.7 taken from Scottish National Transport Strategy pg 9

³⁵ Department for Transport, 2019. Future of mobility: urban strategy. [online]. London: Department for Transport. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786654/future-of-mobility-strategy.pdf

In addition to the Scottish Government's commitment to phasing out the need for new petrol and diesel cars and vans by 2032, the Scottish Energy Strategy (2017) outlines aims to expand electric charging infrastructure, create Scotland's first 'electric highway' on the A9, accelerate the procurement of ULEVs in the public and private sectors thereby transforming public sector car and van fleets by the mid-2020s and commercial bus fleets by the early 2030s.

Specific support for those looking to purchase a ULEV in Scotland include:

- Grants towards costs of home installed charging are funded by Transport Scotland and delivered by the Energy Savings Trust.³⁶
- Interest free loan up to £35,000 over six years provided by the Energy Savings Trust towards a ULEV vehicles³⁷
- Interest free loan for the purchase of e-bikes, including e-cargo bikes provided by the Energy Savings Trust.

The Transport (Scotland) Act 2019 provides new powers for Local Authorities providing the opportunity for, amongst other things, greater control and operation of local bus services as well as enhanced partnership working arrangements, enforcement of Low Emission Zones and discretionary powers to introduce a Workplace Parking Levy, all aimed at improving sustainable transport and reducing car use.

This has paved the way for Low Emission Zones to be established in Scotland's four largest cities, Glasgow, Edinburgh, Aberdeen and Dundee, to address what the Scottish Government recognises as the transport-related air pollutants: nitrogen oxides gases (NOx) and fine particulate matter (PM2.5 and PM10).³⁸ While these were originally due to be implemented in 2020, they have been delayed until 2022 due to the Covid-19 pandemic.

Additionally, Transport Scotland is developing a targeted skills plan to ensure that the demand for new skills that is driven by increasing ULEV vehicles can be catered for in Scotland.

The North East of Scotland

Nestrans, the Transport Partnership for Aberdeen City and Aberdeenshire, first produced a Regional Transport Strategy (RTS) to set the 20-year vision and direction for transport provision in the North East in 2008. A refresh of this strategy was published in 2014 and the development of the third RTS for the north east commenced with a workshop with Board Members in February 2019 where it was agreed that the RTS would remain a long-term strategy looking forward over a 20-year period to 2040. The draft RTS was published in August 2020 for public consultation and is currently available to view along with the supporting documents on www.nestrans2040.org.uk.

³⁶ Energy Savings Trust (2020) *Electric Vehicle Loan* <https://energysavingtrust.org.uk/scotland/grants-loans/electric-vehicle-loan> accessed 04/03/2020

³⁷ Scottish Government Website (2020) *Low Carbon Transport Loan* <https://www.gov.scot/policies/renewable-and-low-carbon-energy/low-carbon-transport/#loan> accessed 15/06/2020

³⁸ Low Emission Zone Scotland <https://www.lowemissionzones.scot/about/air-quality> Accessed on 12/03/2020

The development of the Draft RTS 2040 has also been supported by background reports and assessments, including the Strategic Transport Assessment, Strategic Environmental Assessment, Equalities Impact Assessment, Health Inequalities Impact Assessment and Fairer Scotland Duty.

A Strategic Transport Appraisal (STA) was undertaken for the north east as part of the Aberdeen City Region Deal in order to collate and rationalise the current and future problems and opportunities within the transport system. The STA was based upon extensive input from a wide-range of stakeholders and identified five option categories broadly comprising of:

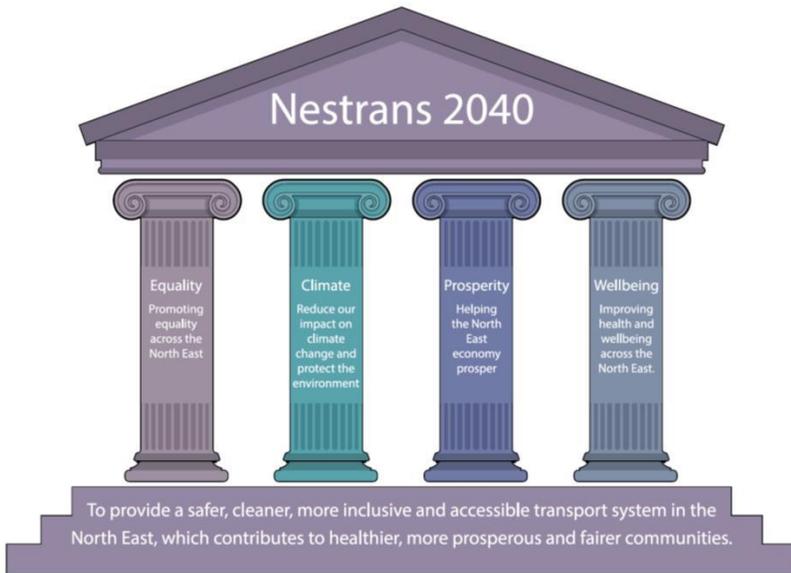
- **city connectivity:** ensuring sustainable connectivity to / from, and within the regional centre;
- **rural connectivity:** providing sustainable and proportionate travel choices across the region's more rural hinterland;
- **strategic connectivity:** linking the region effectively to the rest of Scotland and internationally;
- **safety:** moving towards a zero fatalities target; and
- **demand management** measures: to manage resources effectively and encourage the use of sustainable modes.

Overall, this study is intended as a transport package to begin transitioning the north east to a post-carbon, more prosperous, safer, and more equitable future. These aspirations are duly reflected in the vision and priorities of Nestrans' draft 2040 RTS. This draft RTS and supporting documents went out for public consultation in August 2020 for a period of ten weeks.

The vision of the draft RTS for 2040 is:

"To provide a safer, cleaner, more inclusive and accessible transport system in the North East, which contributes to healthier, more prosperous and fairer communities."

The four overarching aims of the National Transport Strategy are reflected in the draft RTS's four pillars.



Six key priorities sit within the framework of these pillars and set the tone and direction of the strategy overall. These have been developed to relate to each of the four pillars and to provide a clear statement of intent on what the strategy is aiming to achieve.



Meeting these priorities entails achieving a combination of increased shared transport, active travel and behaviour change improvements supported by demand management measures. This balance of measures would reduce traffic, create healthier places, and provide a revenue stream through which to deliver improvements to sustainable modes and choices. The recommendations from this strategy reflect the role that ULEVs could have in facilitating a movement towards this while contributing to the objectives outlined in the four pillars of the RTS.

	Four equal pillars of the RTS			
	Promoting equality across the north east	Helping the north east economy prosper	Taking action to reduce impact on climate change and protect the natural and built environment	Improving health and wellbeing across the north east
Six key priorities				
Improved journey efficiencies to enhance connectivity	✓	✓		
Zero fatalities on the road network				✓
No exceedances of World Health Organisation (WHO) safe levels of emissions from transport	✓			✓
Significantly reduced carbon emissions from transport to support net-zero by 2045			✓	
Accessibility for all	✓	✓		✓
A step change in public transport and active travel enabling a 50:50 mode split between car driver and sustainable modes	✓	✓	✓	✓

For example, given the large rural area in the north east and the fact that travel patterns do not always align with core transport corridors, substantial public and commercial uptake of ULEVs and a shift to low emission buses will be pivotal to delivering a significant reduction in emissions from transport in the region and achieving no exceedances of WHO levels of air quality. Further policy headings from the draft RTS are outlined in the below table.

Policy Headings from the draft Regional Transport Strategy

- Increasing the number of people travelling actively for health and the environment
- Developing the rail network
- Aberdeen Rapid Transit
- Improving the region's bus network
- Maximising the benefits of park and ride
- Managing demand
- Reducing emissions from transport
- Encouraging behaviour change
- Maintaining and improving the region's road network
- Facilitating the movement of freight
- External air and sea connections
- Road safety and casualty reduction
- Improving accessibility in rural areas
- Improving access to health
- The affordability of transport
- Improving access to the transport network for all
- Planning and designing places for people
- Future impact of new technologies

These targets take account of the North East of Scotland's Strategic Development Plan (SDP) transport objective:

"To make sure that all new developments contribute towards reducing the need to travel long distances and encourage people to walk, cycle or use public transport by making these attractive options³⁹"

The aims also dovetail into the SDP's goal of promoting the link between land use and transport to encourage active travel and the use of public transport, and its aim to maximise the opportunities for charging and refuelling network for electric and hydrogen vehicles. Similarly, the North East's Regional Economic Strategy sets out an objective to improve deployment of low carbon transport in the city and urban areas.⁴⁰

It is also important to note that the SDP highlights the fact that a more diverse mix of renewable energy sources, along with storage, will be necessary to meeting the Scottish Government's renewables targets. This will entail upgrading the North-East and East Coast electricity transmission lines from 275 kilovolts to 400 kilovolts.

The draft RTS notes that decarbonising the transport network in the North East will require substantial public and commercial uptake of ULEVs, a Low Emission Zone in Aberdeen city centre and a substantial shift to low emission buses across the region. Additionally, since the RTS has a target for 50/50 modal split of sustainable transport and car-based transport, achieving significant decarbonisation will entail having significant EV infrastructure across the north east including charging points along key strategic routes such as the A90, A92, A96 and A93, at key tourism locations and at links to new developments.

For example, linking ULEV infrastructure to park and ride sites, Aberdeen Rapid Transit when it is developed, and to other key parts of the public transport network would help to optimise emissions reduction in areas where public transport and active transport are not seen as viable options. It would also be complementary to the wider RTS aim of delivering substantial mode shift away from the private car.

In short, maximising ULEVs' contributions to the RTS aims will include:

- promoting EV charging points at locations that link to the rail network, Aberdeen Rapid Transit, the bus network and park and ride to encourage greater active and / or sustainable transport;
- improving ULEV access and uptake in rural areas, particularly where public transport options are limited;
- exploring and promoting the impact of new technologies, particularly improvements to charging technology and prospects for Connected and Autonomous (CAV) vehicles.

In addition to reducing emissions in the region and improving air quality, these aims could encourage an increase in use of public transport and therefore contribute to the RTS' aims such as turning around declining bus usage figures by 2022.

³⁹ Aberdeen City and Shire Strategic Development Planning Authority (2020) *Aberdeen City and Shire Strategic Development Plan* pg 44

⁴⁰ REGIONAL ECONOMIC STRATEGY Securing the future of the north east economy (2018) pg 23
https://investaberdeen.co.uk/images/uploads/Regional_Economic_Strategy_0.pdf accessed 01/09/2020

Civitas Portis

From 2016 to 2020, Aberdeen has been one of five “living laboratories” in the Horizon 2020 CIVITAS PORTIS project which is seeking to develop and implement policies that will: (i) improve governance for enhanced co-operation between cities and ports; (ii) create more sustainable and healthier city-port environments; (iii) shape more integrated transport infrastructure and mobility systems; and (iv) improve the efficiency of urban freight transport (Civitas Initiative 2016). Aberdeen’s plans for the project include a range of measures that seek to encourage and develop alternatively fuelled vehicles.

Locally, the project is led by Aberdeen City Council and involves Robert Gordon University, Aberdeen Harbour Board, Aberdeenshire Council and Nestrans. The University of Aberdeen is undertaking assessment of the project.

As part of the CIVITAS PORTIS project, initiatives have been developed under four main areas: governance, people, transport system and goods. The following table provides an overview of work underway in each category / related projects in each area:

Governance

- Aberdeen City’s Sustainable Urban Mobility plan (SUMP) has been re-developed and it is envisaged that this will act as a framework for future city transport projects while supporting the aspirations of regional policy in relation to transport, active travel and demand management options. The SUMP will also complement and expand other strategies including the Aberdeen City Centre Masterplan and the Roads Hierarchy study.
- The SUMP was approved at City Growth and Resources Committee at Aberdeen City Council in December 2019 and the measure leader is seeking funding to implement its short term measures.

People

- A 2018 Origin and Destination study to provide a breakdown of specific journeys in Aberdeen and to inform future transport planning.
- The design, development, manufacture and installation of various wayfinding totems has been approved to facilitate and encourage walking in key points in Aberdeen City. Installation of the totems began in October 2020.
- Travel Planning employer engagement sessions have been undertaken in North Dee, South Dee and Dyce. A lift share scheme and dropped kerbs work is due to be undertaken in North Dee while Dyce Travel Plan is generating a costed action plan and measures to deliver upon the plan.
- A multimodal journey planning tool has been designed, developed and deployed to provide more detailed information, including live and historic data, to the public to help them to plan their journeys. It was launched in Autumn 2020.
- Civitas Portis was going to contribute towards Nestrans’ rail promotion of the new station on the A96 corridor to encourage more people to use this transport, however,

in light of the Covid-19 pandemic, this resource has been repurposed to promote the Scottish Government's safety messages on social distancing.

- Two Travel Planning Guidance documents have been produced. One on the short to medium term, which covers the Covid-19 restrictions and the other will be medium to long terms guidance after the Covid-19 restrictions are lifted.

Transport System

- A Car Parking Strategy and consultation is due to go out in 2020 to gauge feedback on potential demand management options. Efforts were made for this to coincide with the Low Emission Zone (LEZ) and Nestrans' Regional Transport Strategy consultation.
- An LEZ options appraisal was approved by the City Growth and Resources Committee in February 2020. However, the Low Emission Zone requirements from Scottish Government have been postponed due to the Covid-19 pandemic.
- Aberdeen City Council has drafted an EV Strategy while Aberdeenshire Council are in the process of drafting their EV Strategy.

Goods

- An internal Freight Visualisation Tool is complete while two electric vehicles ready for delivery, pending EV Charge Points installation
- Data routing numbers are being collected and a follow-up survey from 2018 re freight routing has been completed.
- Cargo bikes have been purchased and are being loaned to companies to help make deliveries during the pandemic while saving money and reducing emissions.

Over the course of the Civitas Project, external transport projects have also had a significant influence on regional transport including but not limited to the opening of the last section of the Aberdeen Western Peripheral Route (AWPR) in February 2019 and the new Montrose to Inverurie cross rail train service that started in December 2019.

Aberdeen City Council

Aberdeen City Council (ACC) has responded to the Scottish Government's GHG reduction targets with a Net Zero Vision and Infrastructure Plan. The plan sets out how Aberdeen will meet and exceed to the net carbon zero target by 2045 with an ambition to achieve negative emissions.

In addition to the regional visions for the north east, both Aberdeen City and Aberdeenshire Councils have set targets to reduce GHG emissions. Aberdeen City Council aims for a 42.5%

reduction from 1990 levels by 2026⁴¹ while Aberdeenshire Council has committed to significantly reducing GHGs by 2050 with progress being measured every three years.⁴²

Significant initiatives have been developed by Aberdeen City Council to make contributions to this including the Strategic Urban Mobility Plan and the City Centre Masterplan proposals to create a network of bus, cycle and local access only sections within the city centre to reduce traffic through the city centre. Continued promotion of ULEVs is reflected in both reports.

Aberdeen City Council has also revised its Roads Hierarchy, with a view to promoting the City Centre as a destination, rather than a through route. During the Covid-19 pandemic, elements of both reports have been taken forward including the extension of pedestrian space, cycle lanes and traffic easing measures while a parking framework is due to go out for consultation.

Furthermore, hydrogen fuel cell vehicles and EV specific measures have been set out in Aberdeen City Region Hydrogen Strategy and Action Plan (2015 –2025) and the EV Framework respectively. The Aberdeen Local Transport Strategy (2016-2026) fed into the EV framework including more details through initial EV objectives.

Aberdeenshire Council

In recent years, Aberdeenshire Council, with support from Nestrans, has worked to develop a network of mini-interchange hubs at key locations across Aberdeenshire, providing opportunities for small scale park and ride and interchange onto the mainline bus network and to help facilitate car sharing or park and pedal. Currently there are mini-interchange hubs in Potarch, Aboyne and Fyvie with further sites planned at Crathes and Oldmeldrum.

The draft RTS notes that Nestrans will support Aberdeenshire Council in the expansion of the network of mini interchange hubs to improve accessibility in rural areas. These will allow people in more rural parts of the region to access the mainline bus network either by car, feeder bus services, demand responsive transport services or by cycling and walking. Future locations will include Crathes and Oldmeldrum. Aberdeenshire Council are also in the process of developing an EV strategy.

Aberdeenshire Council will also begin charging of £0.21 per kWh for use of the Council EV charger units from 4th January 2021. This was previously due to commence in April 2020 but was delayed due to the Covid-19 pandemic. Off-street car park charges will also resume from 4th January 2021 in Aberdeenshire while a review of roads policies is also being undertaken with a recommendation to move towards default 20mph in designated town centres and minor roads.

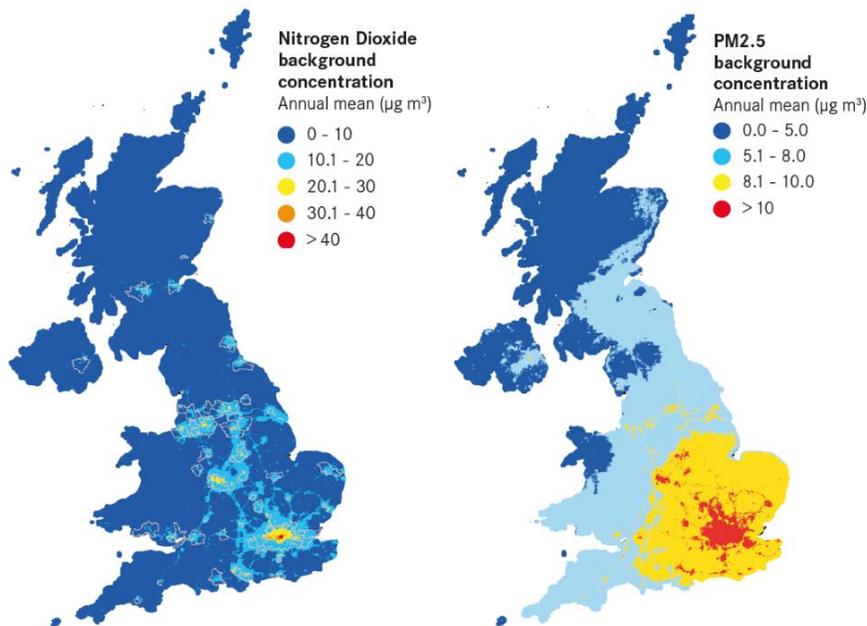
5. The Current Situation and Future Forecasts

⁴¹ Community Planning Aberdeen (2019). *Local Outcome Improvement Plan 2016-26*
<https://communityplanningaberdeen.org.uk/aberdeen-city-local-outcome-improvement-plan-2016-26/>
Accessed 19/03/2020

⁴² Aberdeenshire Council, 2019. *Reducing Greenhouse Gases*
<https://www.aberdeenshire.gov.uk/environment/green-living/Reducing-Greenhouse-Gases/>

Road transport accounts for 34% of all NO₂ emissions in the UK, although the figure goes up to 42% in cities.⁴³ PM_{2.5} emissions are also higher in large towns and cities than in their surrounding area although only 12% of these emissions are accountable to transport.⁴⁴ Measures in the UK's Clean Air Strategy, are likely to move the UK targets towards WHO guideline levels for annual mean PM_{2.5}⁴⁵

Nestrans' monitoring report noted a reduction in average concentrations of nitrogen dioxide and particulates at key sites in the north east of Scotland. This is particularly encouraging given the relatively good air quality in Aberdeen and Aberdeenshire compared to other parts of the UK. While Aberdeen has the 10th highest per capita NO₂ emissions out of the 63 largest towns and cities in the UK, it was the third cleanest city in the UK for a measurement of five main pollutant levels. Aberdeen also has the lowest levels of PM_{2.5} deaths in the UK and the 13th lowest per capita levels out of the 63 towns and cities.



46

⁴³ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 12/03/2020

⁴⁴ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 12/03/2020

⁴⁵ Defra (2019) *Assessing progress towards WHO guideline levels of PM_{2.5} in the UK* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/825472/air-quality-who-pm25-report.pdf Accessed 17/03/2020

⁴⁶ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 12/03/2020

Figure one highlights the relatively good air quality in the North East with an annual mean of 0–10 µg/m³ of NO₂ registering across the region except in Aberdeen City, Peterhead and Fraserburgh, where it is 10.1–20 µg/m³, and while PM_{2.5} concentration of 0-5 µg/m³ covers most of the region’s geographical area, annual mean levels between 5.1-8 µg/m³ registered across large parts of the North East region. These levels fit into a broader trend of poor air quality being particularly pronounced in cities and large towns.

While these do not breach the WHO’s current recommended levels, the WHO have recognised that there is, in principle, no safe level of PM_{2.5} from a health perspective and they will be revising their recommended levels in 2020 (it should be noted that this was an aim prior to the Covid-19 pandemic).⁴⁷ So, while Aberdeen City identifies NO₂ and larger particulate matter (PM₁₀) as the main pollutants of concern in related to road traffic emissions⁴⁸, there appear to be benefits for including PM_{2.5} and aiming for levels of 0-5 µg/m³.

Aberdeen’s lower levels of PM_{2.5} can partially be explained by its relative isolation since many southern UK cities are affected by pollution that crosses the English Channel from the continent⁴⁹. However, of those non-road transport such as air transport or shipping was found to contribute a larger share of PM_{2.5} emissions in Aberdeen while an estimated 63 deaths in Aberdeen in 2017 are attributable to PM_{2.5}⁵⁰ Furthermore, since road transport accounts for 80% of Nitrogen Oxide (NO_x) concentrations at the roadside,⁵¹ changes to the type of vehicles used for travel and transport will be crucial to improving air quality.

In short, while Aberdeen has relatively good air quality compared to other UK cities, there are still air quality issues. This is why three Air Quality Management Areas were created, an Air Quality Action Plan has been developed and the city centre is going to have a Low Emissions Zone (LEZ).

Additionally, long-term exposure to air pollution is responsible for an estimated one in 33 deaths in Aberdeen. This is the lowest proportion for cities in the UK and significantly lower than the UK average of one in 19 people⁵². Freight and buses cause an estimated 80% of the air quality issues within Aberdeen despite only representing 20% of total traffic within the city centre.

⁴⁷ World Health Organisation - [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health) Note: WHO Air quality guidelines are under revision with an expected publication date in 2020.

⁴⁸ Aberdeen City Council (2019a). *Air Quality Annual Progress Report for Aberdeen City Council*. <https://www.aberdeencity.gov.uk/services/environment/air-quality-aberdeen/air-quality-reports> accessed 12/03/2020

⁴⁹ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 13/03/2020

⁵⁰ Centre for Cities (2020) *Cities Outlook 2020* <https://www.centreforcities.org/wp-content/uploads/2020/01/Cities-Outlook-2020.pdf> Accessed 13/03/2020

⁵¹ Department for Transport (2019) *Future of mobility: urban strategy*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786654/future-of-mobility-strategy.pdf accessed 11/03/2020

⁵² Centre for Cities (2020) <https://www.centreforcities.org/publication/cities-outlook-2020/> Accessed 11/03/2020

Greenhouse gas emissions are also heavily linked to transport, which, including international aviation and shipping, overtook energy supply as the largest sectorial contributor to Scottish GHG emissions at 37%⁵³. Furthermore, 68% of transport's carbon emissions come from road transport, which suggests that reducing road transport's emissions, including through measures such as substantial public and commercial uptake of ULEVs supported by a substantial shift to low emission buses across the region, will be critical to meeting Scotland's climate change targets.

In late 2019, there were 15,000 charging devices across the UK, equating to 22,500 places to charge. The UK Government has begun mapping charge points and has produced a league table of availability by council area to raise awareness of progress⁵⁴. Aberdeen City Council and Aberdeenshire Council are both in the top 20% of UK council areas by charge points per 100,000 people and have a total of 77 and 71 charge points respectively.⁵⁵

Scotland now has 32 public charging devices per 100,000 of population, 7.5 per 100,000 of which are rapid charging devices, which is significantly higher than the UK average of 23 and 3.8 per 100,000 respectively.⁵⁶ Additional investment is projected to deliver an additional 1,500 charge points, including 150 new public ones.⁵⁷

A summary of EV charge points in Aberdeen City and Aberdeenshire is in the below table. Since they quantify locations as opposed to the number of chargepoints, they differ from the figures provided by Zapmap.⁵⁸

	Aberdeen City	Aberdeenshire	(Total) 2020
Rapid (50-150 kW)	11	14	25
Fast (22kW)	26	22	50
Standard (3-7kW)	19	13	32

Commented [RD1]: can we add a date to this information?

⁵³ Carbon Account for Transport, No.10, 2018, Scottish Government

⁵⁴ UK Government (2019) 'New 'league table' reveals electric car charging availability across UK as Transport Secretary calls on local authorities to do more' <https://www.gov.uk/government/news/new-league-table-reveals-electric-car-charging-availability-across-uk-as-transport-secretary-calls-on-local-authorities-to-do-more>

⁵⁵ Department for Transport (2019) 'Charging devices in the UK' <http://maps.dft.gov.uk/ev-charging-map/> Accessed on 06/02/2020

⁵⁶ Department for Transport (2019), *Electric vehicle charging device statistics*

October 2019
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850417/electric-vehicle-charging-device-statistics-october-2019.pdf

⁵⁷ Scottish Government (2019) *Statistics on the number of electric vehicles in Scotland: FOI release* <https://www.gov.scot/publications/foi-19-00181/> Accessed 16/03/2020

⁵⁸ ChargePlaceScotland <https://chargeplacescotland.org/live-map/> accessed 16/06/2020

Total	56	49	105
-------	----	----	-----

While these numbers have been increasing, the Electric Vehicle Association Scotland has noted that concern about the availability of EV chargers is replacing concern about the range of EV vehicles.

Charge points in Aberdeen that are run by Chargepoint Scotland were free for EV users up until 1st June 2020, when a one-off cost of 38p and kWh of 19p per hour charge were introduced. These costs cover the base including network costs and electricity consumed by charge points when vehicles are not charging. The tariffs are reviewed annually so potential changes can be introduced from 1st June 2021.

Tariffs for using charge points in Aberdeenshire are going to begin in 2021.

Low Emission Zone Aberdeen

Options for a Low Emission Zone (LEZ) are being explored in Aberdeen, with the Scottish Government providing funding to local authorities to help deliver measures aimed at improving local air quality, such as encouraging use of public transport, traffic management, increased active travel measures, parking policies and the introduction of lower emission vehicles.⁵⁹ Aberdeen City Council began public consultation on options for an LEZ in Aberdeen in Autumn 2020. The following options are being proposed as minimum criteria by Aberdeen City Council:

- Euro 6 for diesel cars (cars registered from September 2015);
- Euro 4 for petrol cars (cars registered from January 2006);
- Euro 6 for heavy diesel vehicles (including older retrofitted engines which would be improved to operate as Euro 6);
- Electric and hydrogen vehicles will also be allowed to access the zone.⁶⁰

Furthermore, initiatives identified in Aberdeen City Council's Air Quality Annual Progress Report include continued Council investment in hydrogen and EV infrastructure and ordering fifteen additional hydrogen buses.⁶¹ The Scottish Government has also committed to make Aberdeen a 'Hydrogen model region', with £62m of funding with a proportion to be allocated to hydrogen-based transport initiatives.⁶² This complements the hydrogen refuelling stations at Cove and Kittybrewster in the North East, the 15 hydrogen buses due to arrive during 2020 and the additional six double decker buses that are in the pipeline pending capacity to scale up hydrogen fuel production. Hydrogen cars also make up part of the fleet at Aberdeen City

⁵⁹ Low Emission Zone Scotland <https://www.lowemissionzones.scot/about/air-quality> Accessed on 12/03/2020

⁶⁰ Aberdeen City Council (2019b) *Low Emission Zone* <https://www.aberdeencity.gov.uk/services/roads-transport-and-parking/low-emission-zone> accessed 16/03/2020

⁶¹ Aberdeen City Council (2019a). *Air Quality Annual Progress Report for Aberdeen City Council*. <https://www.aberdeencity.gov.uk/services/environment/air-quality-aberdeen/air-quality-reports> accessed 12/03/2020

⁶² <https://www.current-news.co.uk/news/scottish-government-announces-62m-support-package-for-energy-sector#close>

Council, Aberdeenshire Council, SEPA, NHS Grampian and Co-Wheels Car Club, with the latter offering the first publicly available hydrogen van and cars in the UK.

Funding was also secured by Aberdeen City Council from Transport Scotland to make six e-cargo bikes available for a free trial for businesses of up to one year. The trials, being overseen by Nestrans, will allow organisations to test a means of transport which could not only benefit their business but would also contribute to improved air quality and reduced congestion in the city centre.

International Trends and Policy

The number of electric cars in the world increased by over 2 million in 2017 to reach a total of over 5 million in 2018.⁶³ The market share of electric cars is highest in the following countries: Norway at 46%, Iceland at 17% and Sweden at 8%.⁶⁴ While most European countries have some form of tax incentive to encourage use of low-emission vehicles, the countries with the highest proportions have some of the most generous, such as exemption or partial exemption from VAT in Norway and Iceland.⁶⁵ In absolute terms, China has the world's largest market for electric vehicles, followed by Europe and the United States of America.

The current global increase in EV's market share is projected to continue with over half of new car sales globally forecast to be electric by 2040⁶⁶. Despite this, EVs are still a relatively small proportion of new vehicles, constituting 1.9% of new vehicles registered in the UK (compared to an EU average of 1.4%). EVs are currently cheaper to own and run in the UK although the higher costs of purchasing an EV is still a barrier.⁶⁷

There were 376 hydrogen refuelling stations operating in the world at the end of 2018 while China, South Korea and Japan have targets for over 1,000 more to be constructed by 2030.⁶⁸ They also have targets that would culminate in millions of hydrogen vehicles operating in their

⁶³ International Energy Agency (2019) retrieved from <https://www.iea.org/reports/global-ev-outlook-2019> on the 28th of February 2020

⁶⁴ International Energy Agency (2019) retrieved from <https://www.iea.org/reports/global-ev-outlook-2019> on the 28th of February 2020

⁶⁵ International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro
https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf
Accessed 02/06/2020

⁶⁶ Bloomberg New Energy Finance (2018). *Electric Vehicle Outlook 2018 (online)*. Available at: <https://about.bnef.com/electric-vehicle-outlook/>

⁶⁷ International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro
https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf
Accessed 02/06/2020

⁶⁸ International Energy Agency <https://www.iea.org/reports/tracking-energy-integration/hydrogen> accessed on 11/03/2020

countries by 2030⁶⁹. Japan currently has the most refuelling stations at 100, followed by Germany with 43 and the United States with 38⁷⁰.

The range of electric vehicles can now exceed 200 miles from a single charge⁷¹ although range-anxiety is still seen as a barrier to EV adoption. Hydrogen vehicles are still in their infancy compared to EVs with only 15 public refuelling points in the UK in total, two of which are in Aberdeen⁷².

Despite the early stages in terms of personal vehicles, public transport vehicles powered by hydrogen are becoming more common, including in the north east of Scotland. For example, an initial fleet of hydrogen buses were tested in Aberdeen between 2015 and 2020 whose success has led to the announcement of a new fleet of hydrogen-fuelled double-decker buses, which will be the first of its kind in the world, launching in 2020. The first hydrogen-fuelled train began operating in Germany in 2018 and various other countries are now developing their own hydrogen train programmes.⁷³

Electric bikes account for approximately 55,000 of overall annual UK bike sales of 3 million and are projected to enjoy significant growth over the next few decades.⁷⁴ Similarly, e-cargo bikes can help to reduce demand for fossil fuel-based transport by supporting the movement of goods and are seeing a significant growth in sales in Europe despite the economic impact of Covid-19.⁷⁵ Not only can electric bikes increase the distance that cyclists can typically cover but they also increase the accessibility of cycling.

Car clubs have also seen a significant increase in popularity in recent years.⁷⁶ Since the vehicles in car clubs help to reduce the total number of cars on the road and tend to be cleaner than most private cars, they present the opportunity to reduce the environmental damage associated with car use while helping members to overcome price barriers to accessing ULEVs.

Both the Scottish Government and UK Government are actively supporting the adoption of ULEV vehicles and have recognised the reduction in carbon emissions and improved air quality

⁶⁹ Reuters (2019) *Explainer: Why Asia's biggest economies are backing hydrogen fuel cell cars* <https://www.reuters.com/article/us-autos-hydrogen-explainer/explainer-why-asias-biggest-economies-are-backing-hydrogen-fuel-cell-cars-idUSKBN1W22VQ> Accessed 12/03/2020

⁷⁰ International Energy Agency <https://www.iea.org/reports/tracking-energy-integration/hydrogen> accessed on 11/03/2020

⁷¹ SMMT (2020) <https://www.smmt.co.uk/industry-topics/technology-innovation/ultra-low-emission-vehicles-ulevs/> accessed 04/06/2020

⁷² Zapmap (2020) <https://www.zap-map.com/live/> Accessed 09/06/2020

⁷³ The Guardian (2018) *Germany launches world's first hydrogen-powered train* <https://www.theguardian.com/environment/2018/sep/17/germany-launches-worlds-first-hydrogen-powered-train> accessed 04/06/2020

⁷⁴ Halfords (2020) *The Ebike Forecast* <https://blog.halfords.com/the-ebike-forecast/> accessed 20/07/2020

⁷⁵ Bike Europe (2020) *Cargo bike boom in Europe, over 50% market growth forecast* https://www.bike-eu.com/sales-trends/nieuws/2020/07/cargo-bike-boom-in-europe-over-50-market-growth-forecast-10138222?_ga=2.183914150.1626364129.1595231566-1826538734.1595231566

⁷⁶ Carplus Trust (2018) https://como.org.uk/wp-content/uploads/2018/06/Carplus-Infographics-2018-Scotland-AW_v3_WEB.pdf accessed 21/07/2020

that they could deliver. These goals, in addition to the Electric Vehicle strategies by Aberdeen City Council and Aberdeenshire Council, are outlined in the following sections.

UK Infrastructure and Market for ULEVs

The Society of Motor Manufacturers and Traders data indicates a significant movement towards EV and Hybrid vehicles in new vehicle sales in January 2020 with a 203% increase in battery electric vehicle, a 111.1% increase in plug-in Hybrid Electric Vehicles, a 20.6% increase in Hybrid Electric vehicles, a 721.3% increase in Diesel Mild Hybrid Electric Vehicles and a 215.5% increase in Petrol Mild Hybrid Electric vehicles compared to January 2019⁷⁷. While Diesel and Petrol based vehicles still dominate, making up 19.8% and 61.5% of the total respectively, their sales have decreased by 36% and 9.5% relative to January 2019.⁷⁸

These trends indicate a continuation of the surge in plug-in car ownership of 76.6% that occurred in the UK in 2018. In April 2019, there were 195,000 plug-in vehicles on British roads⁷⁹ and 247,078 licenced Ultra-low Emission Vehicles (ULEVs)⁸⁰ in the UK at the end of 2019⁸¹. While 14,785 of these vehicles were licenced in Scotland, the UK number of 247,078 indicates significantly higher per capita rates of around 1 in 269 owning a ULEV compared to around 1 in 367 in Scotland.⁸² Moreover, the total number of registered vehicles per 1,000 of the population is higher in the Scotland at 622.2 compared to 603.5 in the UK as a whole.⁸³

At the end of quarter 3 of 2019, there were 1,205 licenced ULEV vehicles in the Nestrans area: 724 in Aberdeenshire and 481 in Aberdeen City⁸⁴. This is around 1 per every 406 people, fewer than the Scottish average rate of 1 in 367.⁸⁵ Company cars account for 56% of new fleets car registrations in the UK in 2018⁸⁶

⁷⁷ SMMT (2020) January EV registrations <https://www.smmt.co.uk/2020/02/january-ev-registrations-3/> accessed 10/08/2020

⁷⁸ SMMT (2020) January EV registrations <https://www.smmt.co.uk/2020/02/january-ev-registrations-3/> accessed 10/08/2020

⁷⁹ SMMT (2020) *Record number of plug-in cars on UK roads as ownership surges by three quarters* <https://www.smmt.co.uk/2019/04/record-number-of-plug-in-cars-on-uk-roads-as-ownership-surges-by-a-quarter/>

⁸⁰ ULEVs can refer to plug-in hybrids, battery powered electric vehicles, hydrogen fuel cells and biofuels.

⁸¹ Official UK Transport Statistics 2020 <https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01> retrieved on 27/02/2020 at 10:54

⁸² UK population of 66.44 million and Scottish population of 5.43 from ONS data mid-2018

⁸³ Official UK Transport Statistics 2020 <https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01> retrieved on 27/02/2020 at 11:30

⁸⁴ Official UK Transport Statistics 2020 <https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01> retrieved on 27/02/2020 at 11:30

⁸⁵ Population estimates retrieved from ONS mid-2018 levels. <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2018>

⁸⁶ International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro

https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf
Accessed 02/06/2020

Connected and Automated Vehicles

Transport Scotland has published a Connected and Automated Vehicles (CAV) Roadmap for Scotland which outlined the transformative potential of CAV and the fact that they could help to deliver key priorities in the NTS. The significance of CAV's role in future infrastructure is highlighted by its projected value of £760 billion by 2030. The overarching message is that Scotland is open for business to continue the testing, trialling and refining of CAV technologies. Since most autonomous vehicles are expected to be ULEV⁸⁷, there is significant overlap with this ULEV strategy.

CAV development comprises of the following broad range of levels:

- Level 0 – no automation.
- Level 1 – driver assistance; as seen in many cars now e.g. lane assistance, adaptive cruise control.
- Level 2 – partial automation e.g. traffic assist systems, Tesla autopilot.
- Level 3 – conditional automation, capable of self-driving under some circumstances.
- Level 4 – high automation, capable of self-driving on prescribed routes.
- Level 5 – full automation, self-driving in all road conditions.

Trials of CAV technologies are already taking place in Scotland and internationally and the Draft Regional Transport Strategy for the north east aims to position itself to be able to take advantage and enable pilots and trials in this region.

Despite these tests, the CAV Roadmap for Scotland report also recognises that significant public and private input will be required and that benefits are dependent on CAV being deployed as a wider mobility system. Some specifics include the fact that CAV technologies will need to be aligned with wider technology capabilities including electrification of transport and the movement towards seamless, personalised multimodal journey planning, reservations and connectivity through Mobility as a Service (MaaS).

The report also cautions that for the foreseeable future, autonomous vehicles are likely to be unable to operate in heavy rain and snow, on unpaved roads, or where GPS service or special maps are unavailable, and they may be relatively slow and unreliable in mixed urban traffic. This is particularly significant since the UK is expected to experience greater climatological variability in future including increased precipitation and wetter winters.⁸⁸ Consequently, autonomous vehicles are likely to take several decades to penetrate new vehicle sales, fleets and total vehicle travel.⁸⁹

It is also important to note that many proposed autonomous vehicle benefits, including a reduction in congestion and emissions reductions, require platooning - multiple electrically connected vehicles travelling close together at relatively high speeds on dedicated CAV

⁸⁷ Transport Scotland (2020) *A CAV Roadmap for Scotland* <https://www.transport.gov.scot/media/46708/a-cav-roadmap-for-scotland-final.pdf>

⁸⁸ UK Climate Projections UKCP18, taken from Aberdeen Adapts. <http://ukclimateprojections.metoffice.gov.uk/>

⁸⁹ Autonomous Vehicle Implementation Predictions Implications for Transport Planning 9 January 2020 By Todd Litman Victoria Transport Policy Institute <https://www.vtpi.org/avip.pdf> See pg 15

highway lanes, ideally led by a large truck. Adequate electric vehicle infrastructure will therefore be a key requisite for the realisation of such benefits.

6. Key challenges for growth in the North East and potential options

A barrier to promoting sustainable transport is the fact that the private car can act as an outward display of status and success while creating a feeling of safety and security that alternative transportation methods cannot offer⁹⁰. At 58%, Aberdeen City's car mode share for Travel to Work is greater than Dundee (45%), Glasgow (36%) and Edinburgh (32%).⁹¹ Therefore, while the initiatives outlined within Aberdeen's City Centre masterplan were highlighted within the Strategic Transport Assessment (STA) as a strong opportunity to move towards a less car dependent region and encourage modal shift, ULEV vehicles may be a complementary means of reducing the adverse impacts of transport on public health and the environment where active and public transport are seen as unrealistic or undesirable.

Cost barriers to adopting ULEVs and the fact that most UK drivers take between one and 15 years to change vehicles⁹² means that there are significant challenges in catalysing a transition to ULEVs. Additionally, with increasing traffic since 2013 in the North East,⁹³ it is becoming increasingly important to accelerate the transition from an environmental point of view.

Ensuring EV infrastructure links with the key transport hubs identified in the monitoring report including railways, the airport, ferry terminals and by coach would constitute an opportunity to enhance the appeal of ULEVs while helping to mitigate concerns over range anxiety. The increase in members of car clubs also indicates that there is value in working with them to increase the availability and uptake of ULEVs.

While the private sector has initially been slow in installing charging infrastructure, private sector partnerships and arrangements to share revenue can present strong opportunities to support ULEV infrastructure. BP and Shell are becoming market leaders while Tesla is beginning to roll out a charging network at service stations.⁹⁴ Given the presence of the many large energy companies in the North East, there could be a significant opportunity to engage large businesses to accelerate the introduction of charging points in the region.

Similarly, some retailers, such as Tesco, are beginning to invest in the UK's electric vehicles charging network.⁹⁵ Since the private sector would be likely to invest in higher demand and

⁹⁰ Gatersleben, B (2012). *The psychology of sustainable transport*. The Psychologist, 25(9), pg. 676-679.

⁹¹ Nestrans (2019) *RTS 2040 Scoping Report*. <https://www.nestrans2040.org.uk/update/rts-2040-scoping-report> accessed 19/03/2020

⁹² BBC (2019) *The five major challenges facing electric vehicles* <https://www.bbc.co.uk/news/uk-49578790> accessed 12/08/2020

⁹³ Nestrans' Monitoring Report (2020)

⁹⁴ BBC (2019) *The five major challenges facing electric vehicles* <https://www.bbc.co.uk/news/uk-49578790> accessed 12/08/2020

⁹⁵ Tesco (2018) <https://www.tescopl.com/news/2018/tesco-and-volkswagen-provide-the-largest-retail-electric-vehicle-charging-network-in-the-uk/> accessed 12/08/2020

therefore higher profit chargepoints, selecting visible locations with access to nearby amenities could help to secure co-investment. It could also draw attention to electric vehicles and support air quality initiatives. There is therefore scope to promote the benefits of EV charging points at local business networks, particularly within the context of dwindling footfall at high streets across the north east.

Given the issues that additional charge points can cause for energy supplier, engaging with the local Distribution Network Operator early is essential for making an informed decision on the type and location of chargepoints to minimise connection costs and potential delays.

The Energy Savings trust put a series of recommendations to minimise the risk and maximise potential benefits from EV infrastructure investment.

Energy Saving Trust's Chargepoint procurement recommendations⁹⁶

1 Don't assume that rapid is always right.

Due to the very high costs for the hardware and DNO connections for rapid chargepoints, think carefully about whether the investment is worthwhile. In some cases, slower chargepoints might conveniently meet the needs of residents charging overnight or just 'topping up' their batteries whilst away from home. Remember that plug-in hybrids cannot rapid charge.

2 Don't put all your electrons in one basket.

It is unclear which charging technologies will emerge as the best way to meet the needs of EV drivers who do not have access to offstreet parking. A mix of rapid charging hubs and on-street chargepoints across a local authority area is a prudent strategy. New onstreet chargepoint designs are also arriving on the market, such as more lamppost options or chargepoints that pop-up from the pavement when needed.

3 Don't surprise your DNO.

Engaging with your Distribution Network Operator early will help you to make an informed decision on what type of chargepoint to procure and locations in order to minimise connection costs and delays. Load management and passive provision can help to future-proof the connection. See the EST Guide on Minimising costs of street works and grid connections for EV charging infrastructure for more information.⁹⁷

4 Don't make it difficult to operate or manage.

As a local authority, make sure that you are not locked into an equipment or network provider, either commercially or technically. For example, ask suppliers about interoperability so you can change chargepoint network operator at the contract. Be clear about responsibilities for resolving issues through service agreements. To make it easy for users to access the chargepoints, select chargepoints which allow contactless payments.

⁹⁶ Energy Savings Trust (2019) *Procuring electric vehicle charging infrastructure as a local authority A report by the Energy Saving Trust September 2019*

<https://energysavingtrust.org.uk/sites/default/files/Local%20Authority%20Guidance%20-%20Procuring%20electric%20vehicle%20charging%20infrastructure.pdf>

⁹⁷ Energy Savings Trust (2019) *Minimising the costs of street works and grid connections for electric vehicle charging infrastructure* <https://www.energysavingtrust.org.uk/sites/default/files/Local%20Authority%20Guidance%20-%20Minimising%20the%20costs.pdf>

5 Don't dismiss collaboration.

Private sector partnerships are increasingly common as demonstrated by the range of approaches and case studies⁹⁸

6 Don't always trust the general public.

When thinking about the design and positioning of chargepoints, consider ways to discourage vandalism, and implement good signage, and enforce mechanisms to avoid petrol and diesel vehicles blocking chargepoints.

7 Don't ignore emerging technology.

As of 1 July 2019, all government-funded home chargepoints need to be 'smart'. Consider insisting on 'smart' chargepoints for public infrastructure too. Vehicle-to-grid, new on-street solutions and wireless charging are beginning to arrive on the market.

The below table provides a summary of the challenges and opportunities for the adoption of ULEVs that have been outlined thus far in this strategy.

Challenges	Opportunities
<ul style="list-style-type: none">• Promoting ULEVs but not at expense of walking, cycling and public transport• Small scale of hydrogen• Charger anxiety as well as range anxiety• COVID-19 pandemic catalysing changes to attitudes, priorities and social norms• Securing funding for infrastructure / promotion• Pre-conceived ideas about range• Availability of information on ULEVs• Technological evolution• Energy supply	<ul style="list-style-type: none">• Climate emergency increasing appetite to reduce emissions and awareness of imperative to do so• Air quality issues coming into public conscience• COVID-19 pandemic catalysing changes to attitudes, priorities and social norms• Growing number of vehicles entering market• Private sector getting more interested in charging market• Advantages for business and tourism of being EV friendly• Funding• EV to grid• Storage• Regional excellence in engineering and education

Key points from the challenges and opportunities in the adoption of ULEVs in the North East can be summarised as follows:

- infrastructure to facilitate adoption and use of ULEVs;

⁹⁸ For examples, see - Energy Savings Trust (2019) *Procuring electric vehicle charging infrastructure as a local authority A report by the Energy Saving Trust September 2019*

<https://energysavingtrust.org.uk/sites/default/files/Local%20Authority%20Guidance%20-%20Procuring%20electric%20vehicle%20charging%20infrastructure.pdf>

- market trends and economy of scale;
- upfront costs;
- smart charging and demand responsive systems to maximise emission reductions and cost savings;
- information on ULEVs;

Consequently, these points have been expanded into the action points in this strategy (see Section 7) in addition to the objectives:

- Ensure good infrastructure is in place to make travelling in ULEVs and recharging / refuelling simple across the north east of Scotland, including establishing strong links between charging points / hydrogen refuelling points and key sites
- Help to deliver additional cost and emissions savings through economies of scale, partnership working, smart charging and other demand responsive systems
- Increase the adoption of ultra-low emission vehicles in public transport
- Ensure that ULEVs are the norm for the vast majority of private car owners by 2040
- Ensure that people have the right information to make informed choices about switching to ULEVs and signposting to information on grants and loans.

The environmental and health benefits that wider adoption of ULEVs as an alternative to ICE based transport have fed into the following vision:

“The North East of Scotland will lead in the adoption of ultra-low emission vehicles to improve air quality, tackle climate change and contribute to the region’s ambition to become a leader in the transition to net zero.”

The north east’s draft Regional Transport Strategy sets an aim to achieve 50 / 50 modal split between sustainable transport and individual car use by 2040. The opportunities for ultra-low emission vehicles (ULEVs) to reduce emissions and improve air quality while contributing to this target are threefold:

- encouraging links between low emission vehicles and public and active transport;
- promoting the adoption of ultra-low emissions vehicles in public transport;
- Maximising the adoption of individually owned ultra-low emission vehicles where more sustainable forms of transport are not accessible;

Realising the full environmental potential of low emission technology while recognising the advantages of active transport, as set out in the sustainable transport hierarchy and the Regional Transport Strategy, will entail:

- linking EV infrastructure to transport hubs in the region;
- promoting increased adoption of ultra-low emission vehicles in public transport;
- promoting electric bikes and e-cargo bikes;
- working with car clubs to enhance the accessibility to ULEV vehicles;
- supporting the development of smart charging across the north east; and
- exploring the engagement of taxi firms in the region to facilitate a shift to ULEV vehicles.

This strategy therefore provides recommendations to promote EV charging points along key strategic routes such as; A90, A92, A96, A944 and A93, railway station car parks, park and ride sites, ferry terminal, in future transport infrastructure and residential developments and

improving ULEV access and uptake in areas where public transport options are limited. The strategy also offers recommendations to maximise cost and emissions savings through supporting the development of smart charging such as time-varying pricing and demand response systems such as vehicle-to-grid. Since these systems involve using a communication and control system to ensure that charging coincides with lower periods of demand for electricity, they can deliver cost savings and reduce the emission intensity of the electricity that is used to power vehicles.

7. Recommendations

Incentives to increase ULEVs' adoption

The global trend of significant investment in ULEVs and increasing uptake suggest that EVs and hydrogen vehicles could be expected to benefit from a greater economy of scale and reduced upfront costs throughout the 2020s and beyond. Despite this, affordability is still a major barrier to EV adoption even though the cost of owning electric vehicles tends to be lower than ICE or hybrid vehicles.⁹⁹ Countries with the highest number of EVs as a proportion of vehicles tend to have the most generous financial incentives such as exemption or partial exemption from VAT in Norway and Iceland respectively.¹⁰⁰ This suggests that reducing the upfront purchase cost and promoting the low costs of EVs is crucial to accelerating take-up.¹⁰¹ Specific recommendations put forward by the International Council on Clean Transportation include the following:

- Create significant tax advantages for low-emission vehicles at the point of purchase [such as VAT exceptions]
- Ensure continued tax benefits for low-emission vehicles during their use
- Account for the emissions of a vehicle as part of the company-car tax system
- Balance and regularly re-adjust the tax system to be self-sustaining.¹⁰²

While not all of these recommendations are within the remit of local authorities or regional transport partnerships, lobbying for their promotion on a national, regional and local level constitutes an opportunity to reduce the cost barriers that people currently face to purchasing ULEVs.

⁹⁹ Palmer, K., Tate, J. E., Wadud, Z., & Nellthorp, J. (2018). Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan. *Applied Energy*, 209(October 2017), 108–119. <https://doi.org/10.1016/j.apenergy.2017.10.089>

¹⁰⁰ International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf Accessed 02/06/2020

¹⁰¹ Carmichael, R. (2019) Behaviour change, public engagement and Net Zero. A report for the Committee on Climate Change. Available at <https://www.theccc.org.uk/publications/> and <http://www.imperial.ac.uk/icept/publications/>

¹⁰² International Council on Clean Transportation (2018) Using Vehicle Taxation Policy to Lower Transport Emissions: An overview for Passenger Cars in Euro https://theicct.org/sites/default/files/publications/EU_vehicle_taxation_Report_20181214_0.pdf Accessed 02/06/2020

Grid efficiencies

While there are potential challenges for the grid associated with the extra load that the growth in EVs would drive, the fact that vehicles have a lot of downtime and EV loads are stored in batteries means there is considerable potential for off-peak and flexible charging facilitated by automated smart charging. This presents the opportunity to deliver cost and emissions savings through the following:

- Engage early with the local Distribution Network Operator to minimise connection costs and potential delays
- Support the development of smart charging such as time-varying pricing and other incentives to make cost savings while reducing pressure on the grid and supporting renewable energy; and
- Support the adoption of demand response systems such as vehicle-to-grid.

Promoting the use of hydrogen vehicles, and therefore hydrogen as a means of storing energy, is also a potential means of reducing pressure on the grid within the context of expanding electric vehicle usage while contributing to a sector of long-term strategic significance to the North East of Scotland,

Improvements to ULEV infrastructure

Given the rural nature of much of the north east and over-reliance on the car as the main mode of travel, barriers to public transport usage render ULEVs an important means of improving air quality and reducing GHG emissions. For example, linking EV charging points to park and rides, ferry terminals, railway stations and future parts of the network, such as Aberdeen Rapid Transit subject to its introduction, would help to optimise emissions reduction where public transport and active transport may not be accessible without a car. The increase in members of car clubs in the region also highlights the value in working with car clubs to increase the availability and uptake of ULEVs.

Well placed charging and refuelling infrastructure can help to complement the rest of the transport network while helping to quell range anxiety. For example, EV charging infrastructure at Park and Ride sites or interchange points encourages people to drive to a point and then leave their vehicle to charge whilst taking another mode. The visibility of such infrastructure also builds confidence.

Specific sites to priorities EV infrastructure therefore include the region's five park and ride sites:

- Ellon on the A90(N) (operated by Aberdeenshire Council);
- Bridge of Don on the A956 (operated by Aberdeen City Council);
- Craibstone on the A96 (operated by Aberdeen City Council);
- Kingswells on the A944 (operated by Aberdeen City Council); and
- Newtonhill on the A92 (provided by the developer of the town of Chapelton).

Additional Strategic Routes in Aberdeen and Aberdeenshire include:

- Tourism locations, car rental suppliers and corridors to key routes, Glenshee, Braemar and full A93 corridor;
- Cinemas, Gyms, swimming pools, parks and places where people spend time outside of their vehicle;

- Interchange points, railway station car parks, major shopping and supermarket car parks, large workplaces; and
- key strategic routes such as the A90, A92, A96, A944 and A93.

A series of recommendations from the Draft RTS are also directly applicable to key to this strategy. They include the following:

- Support Aberdeen City Council in the delivery of a Low Emission Zone in Aberdeen City Centre with the primary focus to reduce levels of vehicle emissions that are harmful to human health.
- Work with partners to extend the network of publicly available electric vehicle charging points across the region.
- Work with partners to increase the number of hydrogen refuelling stations across the region in order to unlock the potential for future expansion of the hydrogen vehicle fleet, including buses, HGVs, cars, vans and trains.
- Work with bus operators to fully decarbonise the bus fleet by 2035. This will also have substantial benefits for air quality as buses are significant emitters of NO₂ and PM₁₀. There are substantial challenges for the bus industry in achieving this and we will lobby the Scottish Government for the appropriate financial support to achieve this. The initial focus of this will be on ensuring that services running on key radial corridors into the city, linked to park and rides, are operated by ULEVs. More marginal services in rural areas will be more challenging and the priority will be to maintain bus service provision. However, where services are tendered by the local authorities, we will work to ensure that limiting emissions levels of vehicles being used to provide these services are a component of the tendering process.
- Work to ensure full decarbonisation of council, car-club, taxi and other community planning and Getabout partner vehicle fleets within the period of this strategy, with significant progress by 2030.
- Support the Scottish Government's commitment to the decarbonisation of rail services in the north east e.g. battery, hybrid or hydrogen technology or electrification by 2035.
- Ensure that the north east is open to opportunities to pilot new technologies for alternative fuels for modes such as rail, air, coach, shipping and freight.
- Continue to support the Getabout Partnership and development and roll out of a Regional Sustainable Travel Promotion Strategy to encourage people to travel by active and sustainable modes.
- Continue to use the Getabout sustainable travel brand to promote cultural and behaviour change initiatives across the north east with innovative awareness campaigns and incentives to more sustainable travel methods.
- Support the uptake of E-cargo bikes and alternatively fuelled smaller vehicles for shorter distance internal freight movements within the region.
- Air quality that is cleaner than World Health Organisation standards for emissions from transport
- Significantly reduced carbon emissions from transport to support net-zero nationally by 2045.

In short, key means of contributing to RTS aims will include:

- promoting EV charging points at locations that link to the rail network, Aberdeen Rapid Transit, the bus network and park and ride to encourage greater active and / or sustainable transport.
- require all future residential development proposals to accommodate EV charging

- improving ULEV access and uptake in rural areas, particularly where public transport options are limited
- promoting ULEVs in the commercial transport network in the north east such as additional hydrogen and electric buses
- engaging taxi firms in the region to facilitate a shift to ULEV vehicles
- continuing to work with car clubs to promote ULEV vehicles
- exploring and promoting the impact of new technologies, particularly improvements to charging technology and CAV vehicles
- utilising planning regulations as a lever for installing chargepoints at new developments¹⁰³

These broad areas, combined with other challenges and opportunities from this strategy, have led to the identification of the strategy's five objectives:

1. Ensure people have the right information to make informed choices about switching to ULEVs;
2. Ensure good infrastructure is in place to make travelling in ULEVs and recharging / refuelling simple across the north east including establishing strong links between charging points / hydrogen refuelling points and key sites;
3. Promote the adoption of ultra-low emission vehicles in public transport;
4. Help to deliver additional cost and emissions savings through smart charging, such as monitoring, managing, and restricting charging devices to optimise energy consumption, and other demand response systems; and
5. Ensure that ULEVs are the norm for the vast majority of private car owners by 2040;

Action Plan

The following action plan has been composed to identify actions that are conducive to achieving the strategy's objectives.

Action	Owner	Date	Comments
1. Keep up to date with ongoing changes to national and local policies and strategies.	Nestrans	Ongoing	
2. Promote the use and expansion of ultra-low emission vehicles for public and private vehicles through funding, support and Getabout events.	Nestrans / local authorities and Transport Scotland / Energy	Ongoing	

¹⁰³ The Energy Savings Trust's 2019 report *Procuring electric vehicle charging infrastructure as a local authority* offers a comprehensive guide on installing charging points <https://energysavingtrust.org.uk/sites/default/files/Local%20Authority%20Guidance%20-%20Procuring%20electric%20vehicle%20charging%20infrastructure.pdf>

	Savings Trust / Getabout		
3. Source case studies to give examples of where a business, family, household and/or individual has moved to using a ULEV.	Nestrans / local authorities	Ongoing	
4. Work with local authorities and other stakeholders to ensure that there is charging/fuelling infrastructure available on key routes, at key destinations and in new developments.	Nestrans / local authorities and Transport Scotland	End 2022	
5. Develop an implementation plan on installing and promoting charging and fuelling infrastructure in conjunction with local authorities and key stakeholders.	Nestrans / local authorities	Winter 2020/21	
6. Work with local authorities, energy providers and key stakeholders to promote cost and emissions savings through smart charging and other demand response systems.	Nestrans / local authorities	Ongoing	
7. Amend strategy as appropriate to changing circumstances.	Nestrans	Ongoing	

8. Monitoring Recommendations

The Nestrans Annual Monitoring Report monitors 48 key indicators and highlights trends in transport usage in the north east of Scotland. It therefore presents the opportunity to monitor progress in terms of the amount of EV charging points and estimated ULEV vehicles in the north east and the following areas:

- No exceedances of World Health Organisation (WHO) safe levels of emissions from transport;
- Nitrogen dioxide and particulates (PM10) emissions from transport;
- Proportion of ultra-low emission vehicles as part of the overall vehicle fleet;
- Proportion of the region's bus network run with low emission vehicles.

A number of supporting indicators and targets will be developed to support the six priorities of the draft RTS. Given the parallels between many of the above targets and the fact that they will

be monitored annually, the also present the opportunity to monitor progress against achieving many of the priorities set out in this strategy.

9. Appendices

Appendix 1 – Summary of Air Quality Objectives in Scotland¹⁰⁴

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m ³	Annual Mean	31.12.2005
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m ³	Annual Mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2020
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

¹⁰⁴ Aberdeen City Council (2019a). *Air Quality Annual Progress Report for Aberdeen City Council*. <https://www.aberdeencity.gov.uk/services/environment/air-quality-aberdeen/air-quality-reports> accessed 12/03/2020

Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-hour mean	31.12.2003
Lead	0.25 µg/m ³	Annual mean	31.12.2008

Appendix 2 – Key Points from Nestrans' Monitoring Report

The Nestrans Annual Monitoring Report provides information and background data to support the development of the RTS. It monitors 48 key indicators and highlights trends in transport usage in the north east of Scotland. Some of the key information (pre-covid-19) are outlined in the below table.

Nestrans' Monitoring Report 2020: Select Data

- Increase in traffic (by vehicle kilometre) since 2013
- The number of EV charging points and the number of electric cars has seen significant growth, with 85 chargers and almost 900 vehicles across the north east
- The number of people registered with carshare schemes and the car club is increasing, with over 3,400 registered car sharers and over 1,900 car club registrations, both at their highest ever levels
- 2018 levels of Nitrogen Dioxide in Union Street and Wellington Road in Aberdeen show improvements, with all monitored locations either achieving or close to achieving European defined maximum levels. All locations are within target of the European-defined maximum level for particulates in 2018
- Per capita Carbon Dioxide emissions from transport have seen a 12% reduction across the north east between 2005 and 2016
- Significant growth in rail patronage between 2006 and 2014
- Slight reduction in airport passengers although total remains over 3 million passenger
- Only small fluctuation in Northern Isle ferry passenger traffic of 150,000
- Increase in freight volume through Peterhead and Aberdeen harbours to 5.3 million tonnes, constituting 8% of Scotland's maritime freight
- Increase in coaches to and from the region reaching 384 coach services per week to key destinations
- Increase in the relative cost of bus fares to parking with a day bus ticket in Aberdeen costing approximately 1.9 times the price of 2 hours car parking
- Increase in the number of cyclists on key routes in Aberdeen of 40% between 2008 and 2019
- In 2018, 66% of north east residents drove to work, slightly higher than the national average of 63%
- Mode split on the travel to school shows 50% of children walking, cycling or scooting. Although numbers walking have reduced since 2003, cycling is increasing in both Aberdeen and Aberdeenshire schools with an increase from 1% in 2003/04 to 4% in 2018