

Decarbonisation of the Scottish Wholesale Industry

Creating a Green & Sustainable Local Food & Drink Supply Chain

Fleet Emissions Baseline



SCOTTISH WHOLESale ASSOCIATION

The voice of the Scottish Food, Drink and Allied Trades

Decarbonisation of the Scottish Wholesale Industry Fleet Emissions Baseline

Foreword

The Scottish Wholesale Industry has faced challenges of a historic scale in recent years. The impact of the COVID-19 pandemic, the uncertainties and changes arising from our exit from the European Union and the increasingly urgent climate emergency have created conditions that few of us can have ever imagined.

As Scotland prepares to welcome delegates to the COP26 United Nations Climate Change Conference 2021, it is clear that despite, or perhaps because of, the scale and complexity of the challenges we face, the Scottish Wholesale Industry must make a step-change in how we reduce our carbon emissions.

The Scottish Wholesale Association's (SWA) 'Decarbonisation of The Wholesale Industry' project seeks to support our members by sifting through the evidence and the options and by providing guidance on the most efficient and business effective actions to reduce emissions.

This is not the first decarbonisation project in Scotland, nor the UK, but there are few that take a whole sector approach to the decarbonisation of a complete supply chain. Undertaking this project at sectoral level gives us the evidence base and the business case to work productively with the Scottish Government and its agencies, including Transport Scotland, Zero Waste Scotland and the enterprise agencies to influence investment in helping the sector meet the challenges of achieving net zero.

This is the first publication in a suite of Decarbonisation of The Wholesale Industry resources. It sets out the baseline from which we can measure our progress. I look forward to future reports demonstrating the positive impact of the actions that we as a sector and our partners in government and industry are implementing.



Chief Executive
Scottish Wholesale Association

Decarbonisation of the Scottish Wholesale Industry

Fleet Emissions Baseline

Table of Contents

- Foreword 1**
- 1. Introduction..... 5**
- 2. Background..... 6**
 - About The Scottish Wholesale Association 7
 - The Decarbonisation of the Wholesale Industry Project.....9
- 3. Methodology 11**
 - Defining Emissions..... 12
- 4. The Baseline 14**
 - Vehicle Numbers..... 14
 - Carbon Emissions..... 17
- 5. Opportunities and Barriers 20**
- 6. Conclusions..... 23**
- 7. References 25**

Decarbonisation of the Scottish Wholesale Industry

Fleet Emissions Baseline

1. Introduction

Climate change is perhaps the defining challenge of the 21st century. The Scottish Wholesale Industry, through the carbon our activities emit, is a contributor to climate change but we can and will also be part of the solution.

Greenhouse gas (GHG) emissions from road transport make up around a fifth of the UK's total GHG emissions. This report provides a baseline for our sector – a point from which to plan for change and measure our success. It sets out:

- The context for the SWA's Decarbonisation of the Wholesale Industry project.
- The scale and nature of the fleets owned and leased by members of the SWA.
- A carbon emission baseline calculated in accordance with Government Guidance and the Greenhouse Gas Protocol.
- Association member views of the opportunities and barriers to action to reduce emissions.
- Opportunities for piloting low carbon technology within the SWA membership.

This evidence base has informed the production of a strategic plan to enable the sector to deliver our contribution to net zero through reducing the emissions from our fleets and vehicles.

2. Background

The Paris Agreement, otherwise known as the United Nations Framework Convention on Climate Change, aims to limit global warming to below two degrees centigrade through reducing global greenhouse gas emissions to net zero.

The Scottish and UK Governments have set ambitious net zero targets and successful decarbonisation of transport will be central to achieving these goals given transport represents 36% of Scotland's greenhouse gas emissions.

In June 2019 the United Kingdom, a signatory to the Paris agreement, became the first major economy in the world to pass laws to end the country's contribution to global warming. The legislation sets a target to bring all greenhouse gas emissions to net zero by 2050.

In December 2020, the Scottish Government published Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovery on a Path to Net Zero³. This builds on the Scottish Government's target of ending Scotland's contribution to climate change by 2045 set out in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019²³. It further commits the Scottish Government to achieving this target in a just and fair way through a green recovery, a *“transition to net zero emissions in a way that is just, and that delivers a thriving, sustainable economy.”*

As part of their programme to meet these challenging targets, the Scottish Government has pledged to invest significantly in greener technology. This includes £60 million to support decarbonisation of the industrial and manufacturing sector, the £2 billion Low Carbon Fund and a further £100 million for the Green Jobs Fund.

The 2021-22 Programme for Government sets out plans to help secure Scotland's just transition to net zero. The just transition to a low-carbon economy for people and businesses will be supported by a £180 million Emerging Energy

Technologies Fund to support the development of hydrogen and carbon capture and

NET ZERO

TOTAL GREENHOUSE GAS EMISSIONS ARE EQUAL TO OR LESS THAN THE EMISSIONS REMOVED FROM THE ENVIRONMENT.

storage. Scotland's five-year Hydrogen Action Plan will be published later in 2021, setting out specific actions to support Scottish supply chain activity and drive the development of a low-cost hydrogen capability.

About the Scottish Wholesale Association

The Scottish Wholesale Association (SWA) is the official trade body for Scotland's food and drink wholesaling sector. Our members are 'the wheels to Scotland's food and drink industry' supplying products to over 5,000 independent convenience stores, 30,000 catering, hospitality, tourism and leisure businesses and the majority of public sector establishments including hospitals, schools and prisons.

The Association fulfils a number of critical roles on behalf of members including liaison between our members, suppliers, the wider food and drink trade and partners in retail, tourism and hospitality. SWA also represent the best interests of our members in policy and legislative processes at UK, Scottish and local government levels and provide members with practical advice, support and compliance material in relation to relevant legislative and regulatory provisions.

Throughout the Covid-19 pandemic and the resultant restrictions, SWA has shared sector specific information with the Scottish Government to ensure politicians understood the severe impact market restrictions and other issues were having on Scottish wholesalers.

The Association represents 98% of the Scottish wholesale industry, by monetary value, and has 70 wholesale members. They range from family run single depot businesses to large national household names. 90% of the total number of Scottish wholesalers are Small and medium sized enterprises (SME).

Our members have over 100 depots, located throughout Scotland from Orkney to the Scottish Borders. 56% are located in the central belt and figure 1 shows a breakdown of the main depot locations, broken down by region as follows:

- Highlands & Islands: **16**
- Fife & Stirling: **13**
- Lothians: **17**
- Aberdeen & Dundee: **16**
- Greater Glasgow & Ayr: **43**
- Dumfries & Borders: **3**

From Department for Transport information, our membership accounts for over 3% of all Heavy Goods Vehicles (HGV) registered in Scotland.

The wholesale industry represents a significant part of the Scottish food and drink sector which, prior to the pandemic, was worth £2.9bn and employed around 6,500 people.



Figure 1: Scottish wholesaler depot locations

The Decarbonisation of the Wholesale Industry Project

The decarbonisation project aims to help SWA members transition to greener and more sustainable practices in line with the Scotland's ambitious target of reaching net zero carbon emissions by 2045.

The UK and Scottish Governments and partners have committed to implementing a variety of measures to achieve this target which will directly affect the fleet operations of the Scottish Wholesale Industry. These include:

- The phasing out and eventual ban of the sales of new petrol and diesel cars by 2030.
- The phasing out and eventual ban of the sales of new Heavy Goods Vehicles (HGV) by 2040.^{3,4,5}
- The introduction of Low Emission Zones in Scottish cities which will apply a penalty should vehicles which do not reach a minimum standard for emissions enter the zone.

In the updated Climate Change Plan, the Scottish Government pledge to *“lead the way by phasing out the need for new petrol and diesel light commercial vehicles by 2025”* and *“establish a Zero Emission Heavy Duty Vehicle programme with Scottish Enterprise to support innovation in the Scottish supply chain for HGVs.”*

To support our members in preparing for these changes and to ensure that the sector can play our part in achieving net zero in an achievable and sustainable way, the Association have embarked on an ambitious Decarbonisation of the Wholesale Industry project.

This project, dovetails with our local sourcing and supply chain partnership programme 'Delivering Growth Through Wholesale' which is an education and training programme helping local producers understand, access and distribute through Scottish wholesalers as an effective route to market. SWA are committed to supporting our members and Scottish suppliers to increase the amount and range of Scottish products stocked within our sector. This will assist in the creation of truly local, sustainable, circular food and drink supply chains.

Our Decarbonisation Project will establish a baseline for fleet emissions and produce resources and insights to support the sector to tackle emissions in a planned and

manageable way. The project will also identify the challenges and obstacles to realising our aim and where market intervention may be required, from the Scottish and UK Governments, to enable the sector to achieve net zero carbon emissions across the wholesale food supply chain by 2045.

The project has been designed in three phases:

- **Phase 1: Our Fleet**

Establishing a baseline on the current food and drink wholesale fleet through analysis of the number and types of vehicles, their life cycles, distances travelled, fuel consumption and carbon emissions. Creation of a strategic plan – a roadmap - to support our members transition to low carbon technology and alternative fuels and to highlight the opportunities and challenges the sector faces in making the transition.

- **Phase 2: Our Buildings**

Establishing a baseline on the carbon emissions from our buildings, including chilled and frozen storage facilities and exploring solutions to make them greener and more sustainable.

- **Phase 3: Our People**

Exploring opportunities to reduce emissions arising from how our people travel to and from work and their activities during their working day.

Parallel to the three phases of the project SWA has produced a self-help calculator for members, *Measuring Your Emissions: Road Freight and Vehicle Emissions Toolkit*. This toolkit automatically calculates carbon emissions for member vehicles using their fuel and mileage data. This will help members to monitor their emissions and contribute data to the measurement of progress from the baseline set out in this report.

3. Methodology

Data was collected through desk research, supplemented by a survey of members and a series of in-depth conversations with owners and managers of fleets within the wholesale sector.

A survey of members collected data on:

- Types of Vehicles in the fleet and number of each type.
- Fuel Used including type and volume.
- Number of refrigerated vehicles.
- Opportunities and barriers to action.

The survey achieved a response from 33% of members. The survey request coincided with a relaxation of COVID-19 restrictions on hospitality and leisure businesses which may have created additional pressure on the time which members had to respond.

Respondents were sorted into large, medium and small wholesalers and responses were scaled up according to the number of similarly sized businesses within the Scottish Wholesale Industry.

This information was collected to determine an emissions baseline and to inform considerations on the nature of actions, technologies and supporting infrastructure required to reduce emissions.

The figures presented here do not include any emissions associated with electric vehicles. This is because it was not possible to separate the electricity used to charge these vehicles from the rest of the electricity used on site. Emissions from charging of electric vehicles will be accounted for in the analysis of the carbon produced by building and energy emissions in phase 2 of the Decarbonisation of the Wholesale Industry project.

GREENHOUSE GASES

GREENHOUSE GASES ARE SO CALLED BECAUSE OF THEIR EFFECT ON GLOBAL TEMPERATURES. CARBON DIOXIDE, OFTEN SIMPLY CALLED CARBON, IS THE GREENHOUSE GAS PRODUCED IN GREATEST VOLUME BY FOSSIL FUEL COMBUSTION.

Defining Emissions

In order to produce an evidence-based plan to reduce emissions it is essential to determine the scope of the emissions which fleet operators may be able to influence.

The Greenhouse Gas Protocol provides a set of standards for businesses, governments, and other entities to measure and report their greenhouse gas emissions in ways that support their missions and goals.^{8, 9, 10, 11}

The Greenhouse Gas protocol classifies emissions into three emission scopes.^{8,9, 10,13}

Scope 1 - Direct Emissions

This includes all emissions that are released directly from vehicles/buildings/assets owned and controlled by business. Includes tailpipe emissions and, if vehicles are refrigerated, fuel used to power refrigerant system and any fugitive release from refrigerant gases.

Scope 2 - Indirect Emissions

This includes the indirect emissions from the consumption of purchased electricity. For traditional internal combustion engine vehicles there will be no emissions that fall in this category. For Electric Vehicles, this will include the emissions from production of the electricity used to charge them.

Scope 3 - Other Indirect Emissions

This includes indirect emissions from activities over which the business has no control. For fleet vehicles this would include the emissions generated from the extraction, processing and transportation of the fuel used. It would also include any fugitive emissions associated with refrigerant release from refrigerated vehicles.

The UK Government only requires businesses to record and report Scope 1 and 2 emissions.^{9, 10} This report includes some Scope 3 emissions associated with vehicle fleets.

This project has used the control approach, as outlined in the Greenhouse Gas Protocol, to define the appropriate emissions.⁸ The control approach accounts for all the emissions from operations over which an organisation or business may have control.

This excludes emissions from operations on which businesses rely or in which they have an interest but over which they have no control. In practice this means that the data in this report is drawn from members who own or lease their fleets and vehicles. Arrangements in which members subcontract freight and delivery services to third parties are excluded from this analysis.

WELL-TO-WHEEL EMISSIONS

INCLUDES EMISSIONS THAT RESULT FROM THE EXTRACTION AND REFINING OF FUEL, AS WELL AS THE DIRECT COMBUSTION OF THE FUEL WITHIN THE VEHICLE. IF THE VEHICLE IS ELECTRIC, THEN EMISSIONS GENERATED FROM THE ELECTRICITY USED CHARGING THE VEHICLES ARE INCLUDED.

4. The Baseline

Vehicle Numbers

The total number of vehicles owned or leased by members of the Scottish Wholesale Association is 2,198.

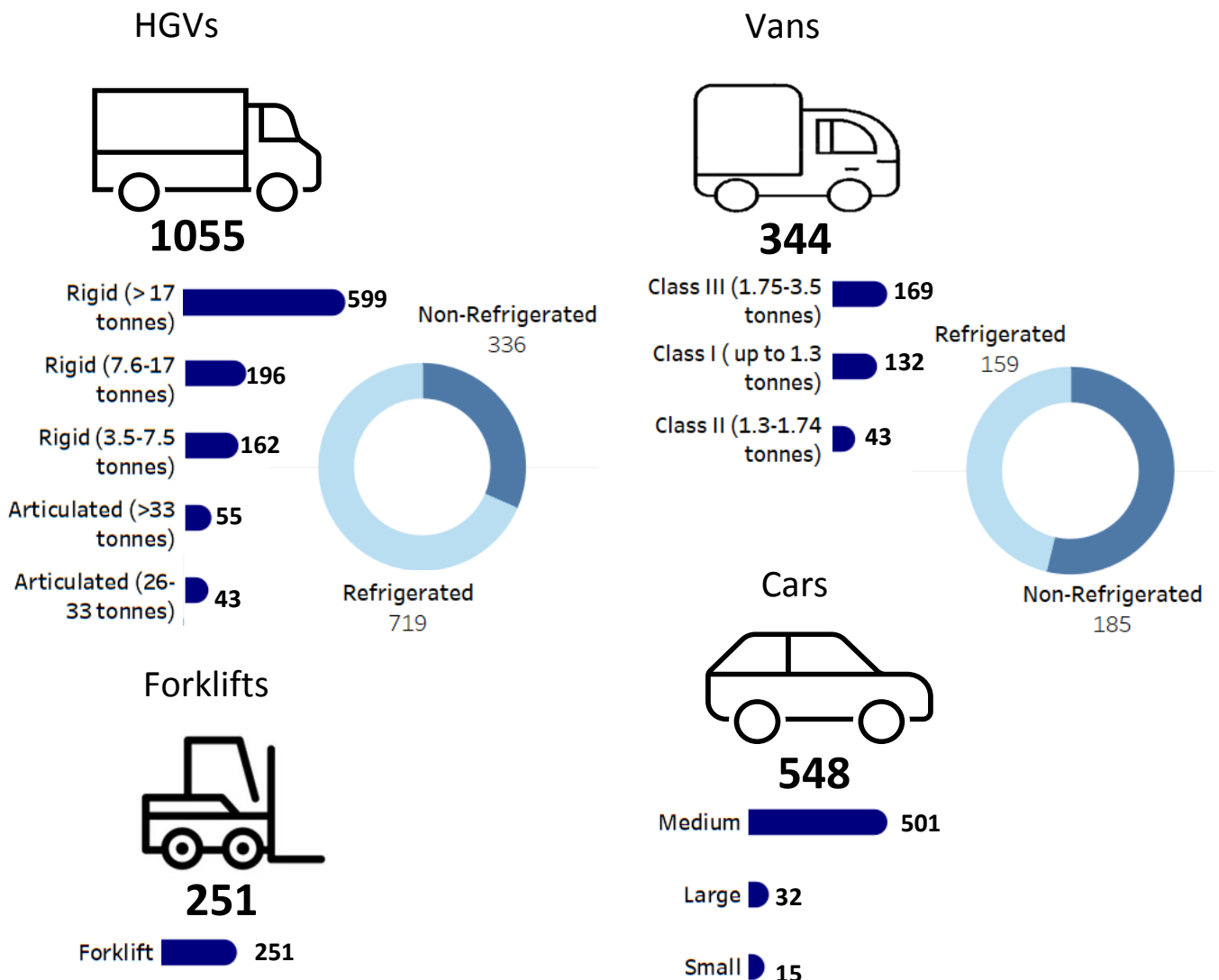
Total Number of Vehicles in SWA

2,198



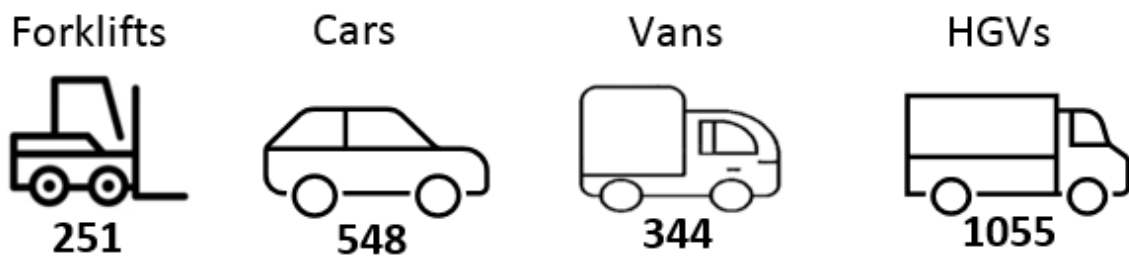
88% of the SWA's vehicle fleet is comprised of fossil fuel vehicles

This is made up of:



Fossil fuel vehicles account for 88% of all fleet vehicles, with the remainder being electric powered. This highlights the scale of the challenge in the move towards decarbonising the fleet.

Forklifts make up most of the electric fleet at 87% of the total number. There are 159 refrigerated vans and 719 refrigerated HGVs. These refrigerated vehicles account for 63% of the total number of vans and HGVs or 40% of the total fleet.



	Forklift		Car		Van		HGV		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
Diesel	15	6%	484	88%	341	99%	1052	100%	1892	86%
Petrol			30	5%					30	1%
Electric	225	90%	31	6%	3	1%			259	12%
Hybrid			3				3		6	0%
Gas	11	4%							11	1%
Total	251	11%	548	25%	344	16%	1055	48%	2198	

Fleet breakdown by type, fuel and as percentage of all vehicles.

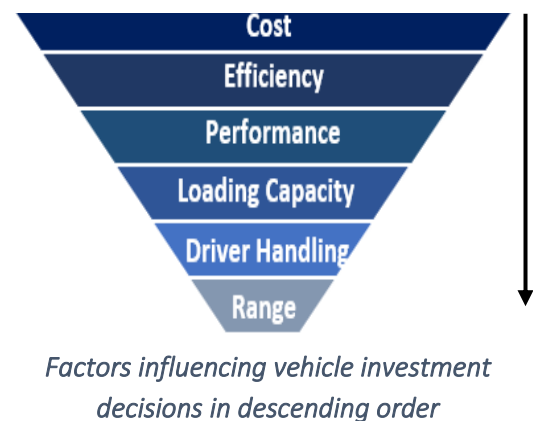
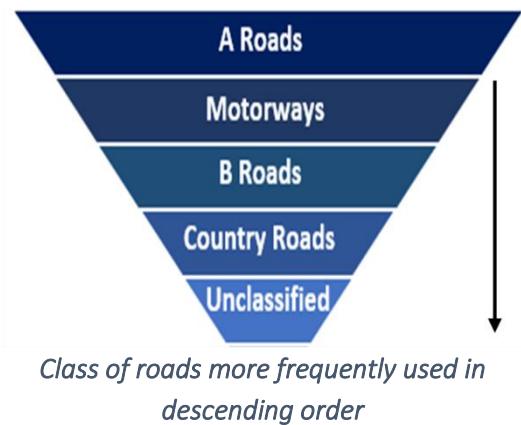
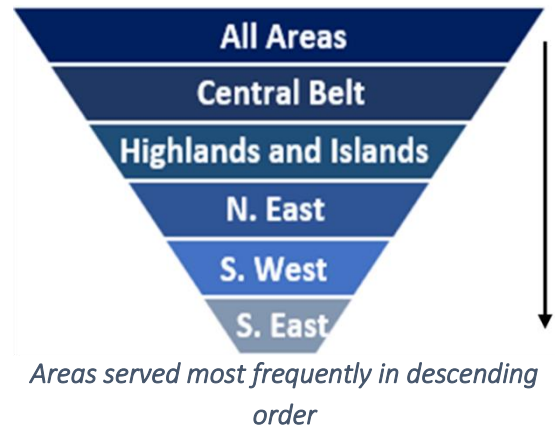
To help identify supporting infrastructure requirements and to outline the performance requirements for any alternative technology, wholesalers were surveyed on the environments in which they operated and their main considerations when selecting vehicles.

Scottish Wholesale Association member vehicles operate throughout Scotland. Over half of members regularly serve all areas of Scotland, on a daily basis.

The membership primarily transports goods on class A roads and motorways with a few operating on country and unclassified roads.

This demonstrates that despite the base of operations for over 56% of members being in the Central Belt, any new charging or refueling infrastructure will need to take account of the areas and distances covered by the industry.

Wholesalers report that the most important factors when considering investment in new vehicles are initial cost and efficiency. For an industry operating on average (pre Covid) net margins of 1.3% and operating on 'just in time' schedules these findings are not surprising. Therefore, any move to alternative vehicles needs to be comparable in performance and cost to match the wholesale business operating model.



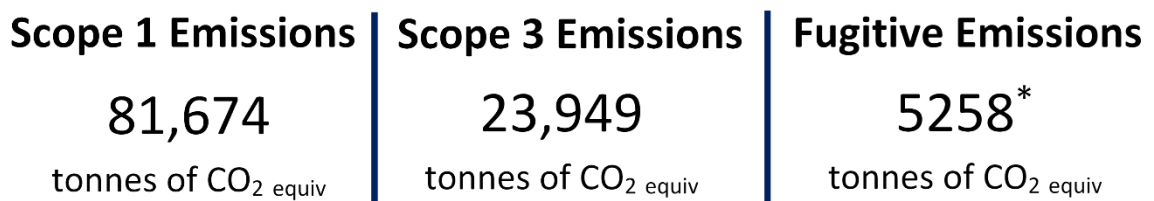
Carbon Emissions

The total equivalent metric tonne volume of CO₂ (MTeCO₂) produced through the SWA wholesale vehicle fleet is 110,881 tonnes. This includes 81,674 tonnes of Scope 1 emissions, 23,949 tonnes of Scope 3 emissions and 5,258 tonnes of fugitive refrigerant emissions.

Total Sector Vehicle Emissions

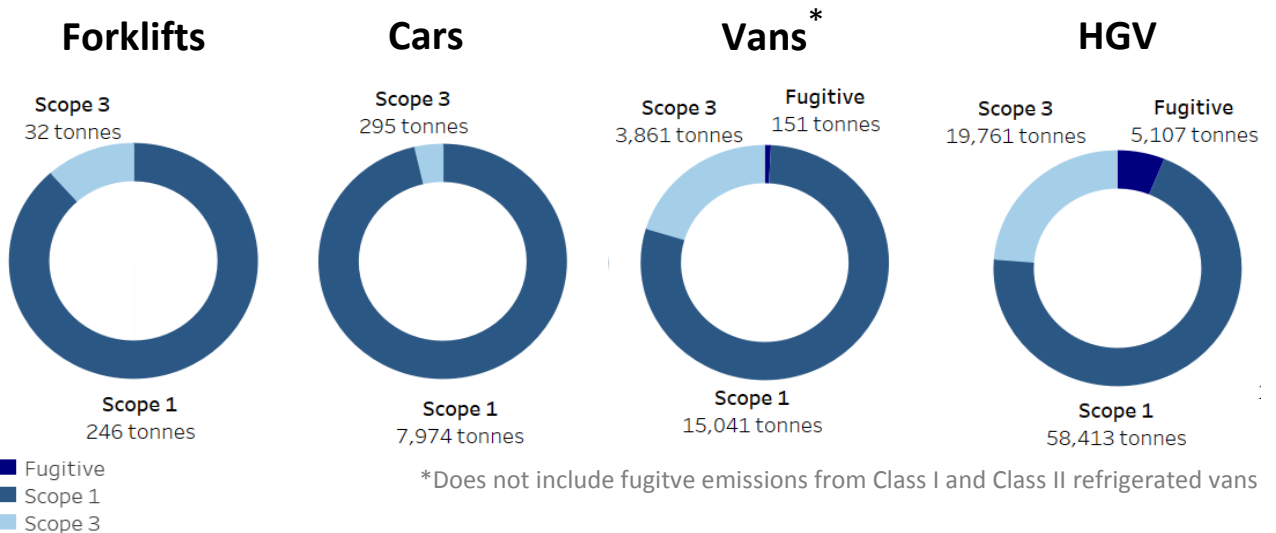
110,881

tonnes of CO₂ equiv

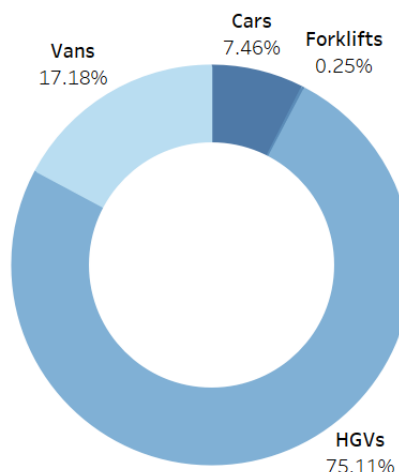


*Does not include fugitive emissions from Class I and Class II refrigerated vans

Emissions by Vehicle Type



The percentage share that each vehicle type contributes to the total wholesale vehicle fleet Carbon Footprint.



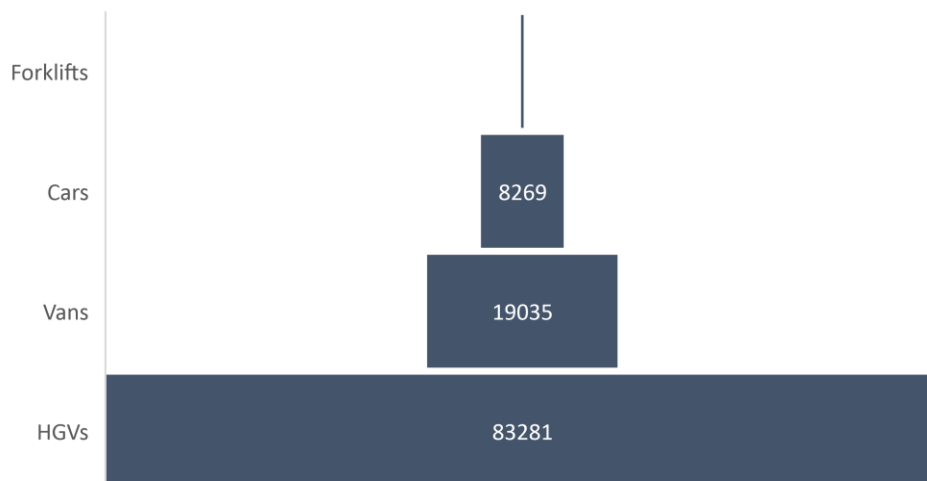
In 2017, total HGV (Scope 1) emissions in Scotland were 1.88 million tonnes CO₂, meaning emissions from the Scottish Wholesale Industry could make up over 3% of the total for all HGVs.

The fugitive refrigerant figure represents emissions associated from refrigerant leaks from refrigerated vehicles. The figure presented is an approximation due to the limits of the data available from which to perform the required calculations and therefore identifies an area for further research. Fugitive refrigerant leakages, although a small proportion of the whole tonnage, are nevertheless important due to their high Global Warming Potential (GWP) value.

GLOBAL WARMING POTENTIAL

GLOBAL WARMING POTENTIAL (GWP) IS A MEASURE OF THE ENERGY THAT 1 TONNE OF A GAS WILL ABSORB OVER A SET PERIOD. CARBON DIOXIDE HAS A GWP OF 1. GASES WHICH ABSORB MORE ENERGY THAN CARBON HAVE A GWP GREATER THAN 1. GASES WHICH ABSORB LESS ENERGY THAN CARBON HAVE GWP OF LESS THAN 1.

Metric Tonnes of CO₂ by Vehicle Type Per Year



Emissions by Vehicle Type

Forklifts

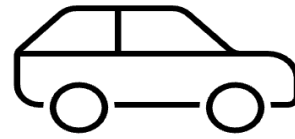


278

tonnes of CO₂ equiv

Forklift  278 tonnes

Cars



8269

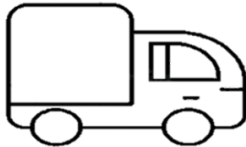
tonnes of CO₂ equiv

Medium  **8049** tonnes

Large  **111** tonnes

Small  **109** tonnes

Vans




19,053

tonnes of CO₂ equiv

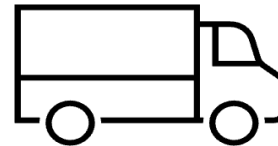
Class III (1.75-3.5 tonnes)  **16,681** tonnes

* Class I (up to 1.3 tonnes)  **1962** tonnes

* Class II (1.3-1.74 tonnes)  **410** tonnes

*Does not include fugitive emissions from Class I and Class II refrigerated vans

HGVs



83,281

tonnes of CO₂ equiv

Rigid (> 17 tonnes)  **33,143** tonnes

Rigid (7.6-17 tonnes)  **28,649** tonnes

Rigid (3.5-7.5 tonnes)  **9491** tonnes

Articulated (>33 tonnes)  **8583** tonnes

Articulated (26-33 tonnes)  **3415** tonnes

5. Opportunities and Barriers

In addition to establishing a baseline, phase 1 of the Decarbonisation of the Wholesale Industry project sought to establish an evidence base on the carbon reduction measures already taken by SWA members and the barriers to further action.

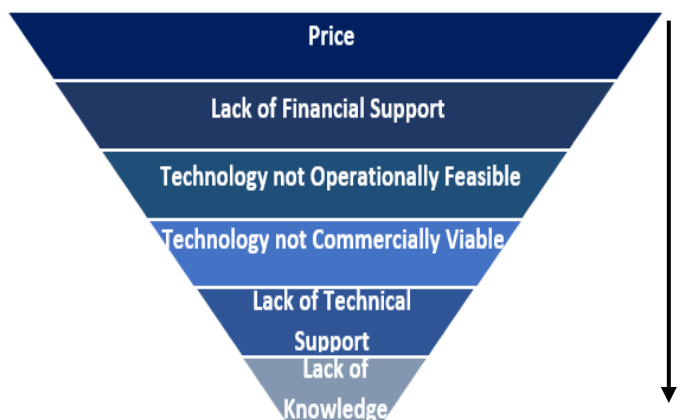
Almost all the SWA members who responded had already implemented some measures within their fleet operations (73%) or were planning to do so (20%). The most common measures implemented to date are more efficient route planning and training of drivers in fuel efficient driving techniques, both of which result in reduced fuel consumption.

83% of those who had implemented fuel efficiency measures reported financial savings achieved through a reduction in fuel spend and a decrease in insurance costs. 75% reported an increase in operational efficiency, 34% believed that their action had improved public perception of their business and 17% reported that it had helped them secure contracts.

The business benefits were reported as the primary motivating factor for implementing change, however, 62% of members cited environmental concerns as a reason for implementing measures.

However, although members have sought opportunities to reduce carbon emissions, 65% have concerns about the short to medium term achievability of change. The main concerns cited are cost, lack of infrastructure, concern about the operational feasibility and commercial viability of the available technologies.

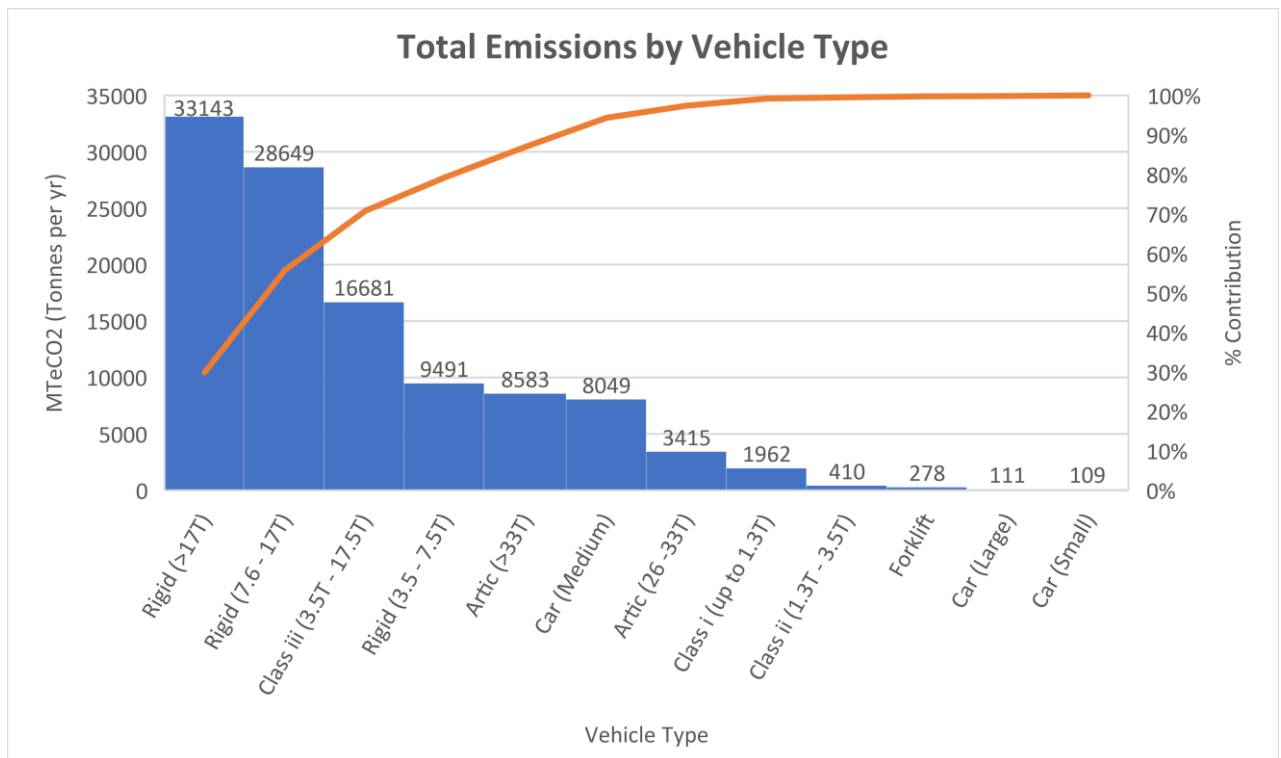
Similar barriers were reported by members in relation to the potential for transition to low carbon alternatives to fossil fuel vehicles. Members who had investigated alternative technologies - mainly electric vehicles - identified initial cost, limited mileage range and lack of infrastructure outside the depot as the primary barriers.



Wholesalers concerns around new green technologies in descending order of importance.

These views chime with findings in the recent ‘Decarbonising the Scottish Transport Sector Final Report’ by Element Energy for Transport Scotland²⁴, which stated *“The zero-emission truck market is at a very early stage of development with a number of OEMs currently conducting early customer trials of pre-commercial vehicles. The larger size, longer daily mileages and shorter stop periods of trucks all add additional challenges to the adoption of zero-emission vehicles. The main barriers to the introduction of zero-emission trucks are technology readiness, vehicle cost, refuelling infrastructure and vehicle availability.”*

While over half of the SWA membership is located in the Central Belt, many transport goods across the whole country, including rural and remote locations. There is a need for sectoral confidence in the adequacy of infrastructure across the entire Scottish road network to encourage uptake of available alternative technologies. While many aspects of the



decarbonisation challenge require UK Government action SWA believe there is a great deal which the Scottish Government can do in the short term to improve charging infrastructure.

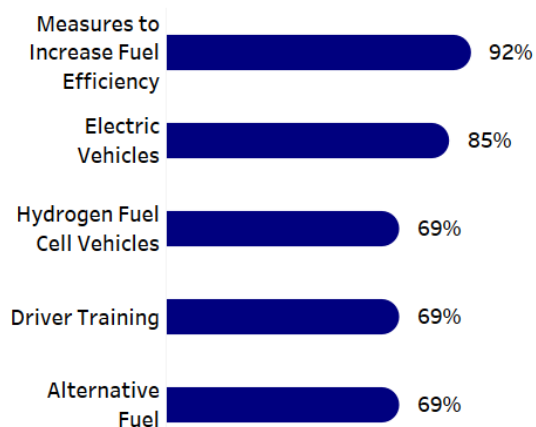
Infrastructure improvements might also include wider improvements to facilities for truck and van drivers using Scottish roads including safe parking areas and toilet/shower facilities. Such developments would improve driver working conditions and might encourage greater and more diverse take up of driver positions.

Heavy Goods Vehicles (HGV's) are responsible for 75% of all fleet emissions, despite making up less than half of the fleet. As highlighted in the SWA Fleet Emissions Reduction Roadmap, the only available short to medium alternatives to diesel HGV's are alternative fuels such as Hydrotreated Vegetable Oil (HVO) or Liquefied Natural Gas (LNG). While these can both reduce Scope 3 emissions by up to 90%, the Scope 1 emissions which create the majority of emissions will only be reduced by 20%. ^{14,15,16,17,18,19}

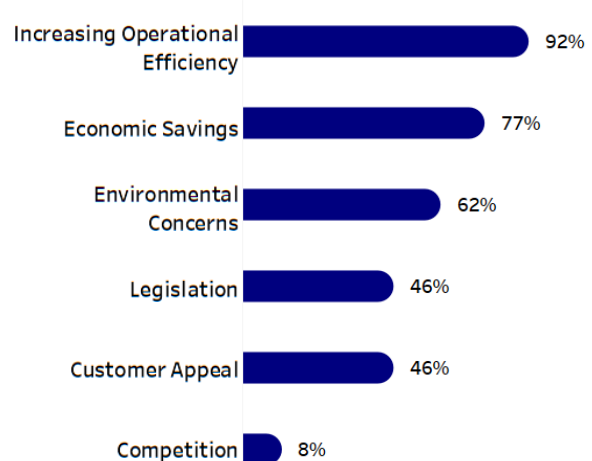
Hydrogen fuel cell vehicles can make a significant reduction to the carbon produced by HGV's. However, currently there are substantial barriers in relation to capital cost of vehicles and the supply chain of renewable hydrogen.

SWA members report that the factors most important in decisions on the new vehicles are initial cost and the fuel efficiency.

Therefore, as reported in the SWA Fleet Emissions Reduction Roadmap, some market intervention from government, and possibly industry supported trials, is needed to accelerate the adoption of alternative technologies by the industry. Nearly 70% of SWA members indicated a willingness to participate in supported tests and trials of decarbonisation technology and measures.



The type of decarbonisation trials members would like to get involved in and the percentage of respondents who would like to take part in tests and trials.



The motivations for undergoing decarbonisation measures and being involved in tests and trials.

6. Conclusions

The Scottish Wholesale Industry fleet incorporates a significant number of vehicles operating across urban and rural locations and is a substantial contributor to carbon emissions. The sector has taken some steps to reduce our carbon emissions, and is keen to go further, but many of our members are understandably concerned about the costs, reliability and performance of new technologies.

SWA are committed to working with the Scottish and UK Governments and other key partners to achieve our net zero goals. Despite the recent challenges faced by the Scottish food and drink wholesale sector and SWA, as a result of the pandemic and Brexit, we remain determined to play a leading role in tackling climate change and have already taken action.

During 2021 we have progressed our Local Sourcing and Decarbonisation projects and we have developed working relationships with many relevant key partners both within the food and drink sector but also with technology providers and developers.

SWA are partnering with Arcola Energy Ltd. to deliver the Scottish Hydrogen Fuel Cell Freight Trial (SHyFT) ²⁵. This is an important trial of hydrogen fuel cell trucks to assess the opportunity for zero-emission fuel cell electric vehicles, supported by a green hydrogen refuelling infrastructure in Scotland. The trial will use learning from field testing battery-electric vehicles in a real-world environment to help design and develop cost-effective, zero-emission heavy goods vehicles and their refuelling infrastructure in Scotland and across the UK.

The wholesale sector operates within very low profit margins – the average pre Covid net margin is 1.3%. Therefore, there is limited scope for pro-active, immediate investment in any technologies which are likely to negatively affect profit. There is also concern that any stepping stone replacement vehicles might require to be replaced again in a short timeframe. Alternative vehicles will need to be comparable to the current fleets already being used, both in terms of cost and performance.

Therefore, government intervention and industry support are likely to be necessary to accelerate the adoption of new technologies. The identified sector asks of the Scottish

Government, in Section 5 of our accompanying 'Fleet Emissions Reduction Roadmap' report, outline six key areas where the availability of sector specific support would assist wholesalers and inspire them to take action to decarbonise the sector. SWA are seeking transformative support from government, which would help build network partnerships and enable and encourage the actions needed to reduce carbon emissions from our fleets and vehicles.

The SWA represent 98% of the wholesale food and drink market in Scotland. As a result, we have the authority to speak on behalf of the sector, and the power to work productively in partnership with government, industry and our members, to take forward initiatives that build the capacity of the industry and play our part in achieving our shared net zero ambitions by 2045.

7. References

1. Scottish Government., u.d. *About Net Zero | Net Zero Nation*
Available at: <https://www.netzeronation.scot/the-importance-of-net-zero> (accessed 29/7/2021)
2. Scottish Government., 2019. *Scotland to become a net-zero society* Available at:
<https://www.gov.scot/news/scotland-to-become-a-net-zero-society/> (accessed 29/7/2021)
3. Scottish Government., 2020. *Update to the Climate Change Plan 2018-2032: Securing a Green Recovery on a Path to Net Zero* Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 29/7/2021)
4. Low Emission Zones Scotland., u.d. *About low emissions zones*
Available at: <https://www.lowemissionzones.scot/about> (accessed 29/7/2021)
5. Thomas-Peter. H., Climate change: Sale of new diesel and petrol HGCs to be banded after 2040. Sky News Available at: <https://news.sky.com/story/climate-change-sale-of-new-diesel-and-petrol-hgvs-to-be-banned-after-2040-12355349> (accessed 29/7/2021)
6. Scottish Government., 2020. *Protecting Scotland, Renewing Scotland: The Government's Programme for Scotland 2020-2021*
Available at: <https://www.gov.scot/publications/protecting-scotland-renewing-scotland-governments-programme-scotland-2020-2021/> (accessed 29/7/2021)
7. Energy Saving Trust., 2013. *cut business costs through improved van fleet management*
Available at: <https://www.energysavingtrust.org.uk/sites/default/files/Van-fleet-management-best-practice-guide.pdf> (accessed 29/7/2021)
8. Greenhouse Gas Protocol., 2015. *The Greenhouse Gas Protocol . A corporate Accounting and Reporting Standard*. Available at: <https://ghgprotocol.org/corporate-standard>
9. DEFRA., 2009. *Guidance on how to measure and report your guidance gas emissions* Available at: <https://www.gov.uk/government/publications/guidance-on-how-to-measure-and-report-your-greenhouse-gas-emissions> (accessed 29/7/2021)
10. DEFRA., u.d. *Guidance on measuring and reporting Greenhouse Gas (GHG) emissions from freight transport operations* Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/218574/ghg-freight-guide.pdf (accessed 29/7/2021)
11. Zero Waste Scotland. U.d. *Carbon Management: reporting. Guidance for public sector organisations* Available at:
<https://www.zerowastescotland.org.uk/sites/default/files/Reporting%20%20carbon%20management%20plans.pdf> (accessed 29/7/2021)
12. Science Based Targets., 2018. *Transport Science-Based Target Setting Guidance* Available at:
<https://sciencebasedtargets.org/resources/legacy/2018/05/SBT-transport-guidance-Final.pdf>
13. Cenex., 2020. *Racing Toward Net Zero How Can Your Fleet Keep Up?* Available at:
https://www.cenex.co.uk/resources/?cenex_service=transport (accessed 29/7/2021)
14. Neste., 2020. *Neste Renewable Diesel Handbook* Available at:
https://www.neste.com/sites/default/files/attachments/neste_renewable_diesel_handbook.pdf (accessed 29/7/2021)
15. Cenex., 2020. *The Renewable Fuels Guide. Helping fleet operators cut carbon emissions*
Available at: https://www.cenex.co.uk/app/uploads/2020/03/RenewableFuelsGuide_email-web-copy.pdf (accessed 29/7/2021)
16. Prussi, M., Yugo, M., De Prada, L., Padella, M., Edwards. JEC Well-To-Wheels report v5. EUR 30284 EN, Publications Office of the European Union, Luxembourg, 2020

17. Prussi, M., Lonza, L., Yugo, M., De Prada., 2019. Decarbonising Transport by 2030: The EC-Industry JEC Analysis. EU Sustainable energy Week. European Commission- Joint Research Centre; CONCAVE; EUCAR, 2019. Available at: https://eusew.eu/sites/default/files/programme-additional-docs/EUSW_JEC_all_v1306_final.pdf (accessed 29/7/2021)
18. Cenex., 2019. DEDICATED TO GAS. An Innovate UK Research Projects to Assess the Viability of Gas Vehicles Available at: <https://www.cenex.co.uk/app/uploads/2019/11/324-003-004-Dedicated-to-Gas-Assessing-the-Viability-of-Gas-Vehicles.pdf> (accessed 29/7/2021)
19. Mottschall, M., Kasten, P. and Rodríguez, F., 2020. Decarbonization of on-road freight transport and the role of LNG from a German perspective. Available at: https://theicct.org/sites/default/files/publications/LNG-in-trucks_May2020.pdf ((accessed 29/7/2021)
20. Fuel Cells Works., u.d. Benefits Available at: <https://fuelcellsworks.com/knowledge/benefits/> (accessed 29/7/2021)
21. US Department of Energy., 2016. 5 Things to Know when Filling Up Your Fuel Cell Electric Vehicle Available at: energy.gov/eere/articles/5-things-know-when-filling-your-fuel-cell-electric-vehicle (accessed 29/7/2021)
22. Deloitte., 2020. Fuelling the Future of Mobility Hydrogen and Fuel Cell Solutions for Transportation Volume 1 Available at: <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/finance/deloitte-cn-fueling-the-future-of-mobility-en-200101.pdf> (accessed 29/7/2021)
23. Scottish Government; Reducing Greenhouse Gas Emissions. Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. Available at: <https://www.gov.scot/policies/climate-change/reducing-emissions/>
24. Element Energy 'Decarbonising the Scottish Transport Sector' Final report for Transport Scotland. Available at: <https://www.transport.gov.scot/media/50338/decarbonising-the-scottish-transport-sector-summary-report-september-2021.pdf>.
25. Scottish Wholesale Association, 2021. SWA Partners with Arcola Energy in Key Hydrogen Powered Road Freight Trial. Available at: <https://www.scottishwholesale.co.uk/news/posts/2021/august/swa-partners-with-arcola-energy-in-key-hydrogen-powered-road-freight-trial-study/>



SCOTTISH WHOLESale ASSOCIATION

The voice of the Scottish Food, Drink and Allied Trades

Scottish Wholesale Association, 30 McDonald Place, Edinburgh, EH7 4NH

www.scottishwholesale.co.uk