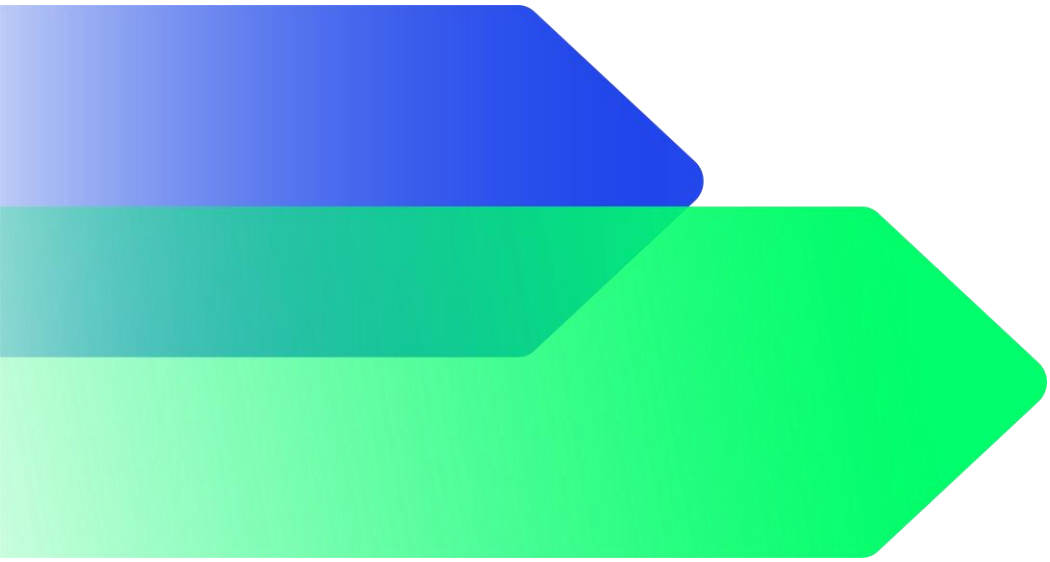
FARESHARE

Environmental Impact Methodology Report

The Carbon Trust

August 2023



Who we are

Our mission is to accelerate the move to a decarbonised future. We are your expert guide to turn your climate ambition into impact.

We have been climate pioneers for more than 20 years, partnering with leading businesses, governments and financial institutions to drive positive climate action. To date, our 400 experts globally have helped set 200+ science-based targets and guided 3,000+ organisations and cities across five continents on their route to Net Zero.

The Carbon Trust's mission is to accelerate the move to a decarbonised future.

Acknowledgments

The Carbon Trust wrote this report based on an impartial analysis of primary and secondary sources.

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This report was sponsored by FareShare For the avoidance of doubt, this report expresses independent views of the authors.

Authors:

Ross Davenport Ross.Davenport@carbontrust.com

Hannah Carver Hannah.Carver@carbontrust.com

Isabelle Stretton Isabelle.Stretton@carbontrust.com

Fergal Byrne Fergal.Byrne@carbontrust.com

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1. Executive Summary

Wasted food has two areas in which it also has a negative environmental impact, both the wasted embodied emissions of producing the food but also how the waste then degrades and releases further emissions. These two emission sources associated with food waste make up around 8-10% of global GHG emissions.

This report sets out the details of the work that was conducted between the Carbon Trust and FareShare and their network partners, to explore the environmental impact of their operations in redistributing surplus waste food for the reporting period of FY 2022.

The impact analysis focused on the organisation and distribution emissions of FareShare's own operations and third-party transport, the embedded carbon and water footprint of the food that was prevented from waste, as well as the overall emissions that FareShare enables the avoidance of, by preventing food from leaving the human supply chain.

FareShare's operational footprint included within its boundary all FareShare UK and network partner's own operational emissions and well as any third-party transport emissions. This carbon footprint was 13,976 tCO_2e on a location-based approach, with third-party transport accounting for almost two thirds of the footprint, so for every tonne of surplus food redistributed around 0.44 tCO_2e is released.

The embedded carbon and water footprint accounts for the total emissions and water that has been emitted and used to create the food that FareShare then receives. By FareShare preventing this food from going to waste, it prevents the embedded carbon and water from being wasted also. FareShare in total prevented 63,810 tCO_2e and 83,872 million litres of water from being wasted. Which accounts for 2.03 tCO_2e/tonne surplus redistributed food and 2.66 million-litres/ tonne surplus redistributed food.

2. Introduction

FareShare encompasses a national network of charitable food redistributors within the UK, the organisation takes good quality surplus food from across the food industry and get it to almost 8,5000 frontline charities and community groups. FareShare would like to understand and communicate the organisation's positive environmental impacts generated by redistributing surplus food that would otherwise be wasted. The Carbon Trust carried out an analysis quantifying these environmental impacts as greenhouse gas emissions and embedded water consumption. This report explains the methodological basis for the conducted analysis, and the result arrived.

The FareShare's overall environmental impact is split into the organisation's operational emissions, and the impact of avoided food waste (as shown in Figure 1). These two categories were analysed separately, and hence two models were created. The water consumption of FareShare's own operations was not calculated as it fell outside the scope of this analysis.

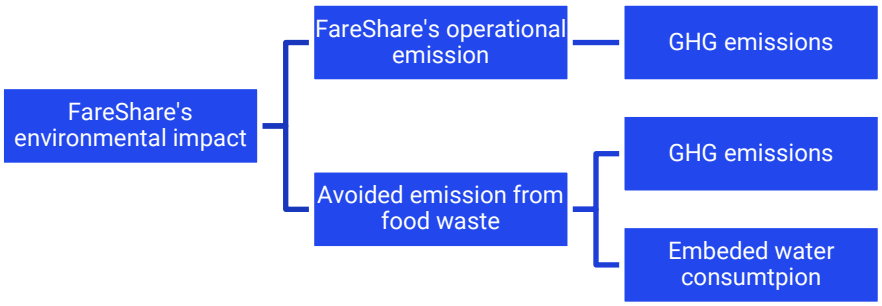


Figure 1 FareShare's environmental impact

FareShare's operational emission is analysed as scope 1 and 2 emission, and outsourced distribution and transportation emissions following the Greenhouse Gas Protocol Organisational Footprinting Standard, which overlooks both direct and indirect emission generated through the organisation's own facilities and vehicles, as well as purchased electricity, cooling, and heating as demonstrated in Figure 2. This category will be referred to as "FareShare's Scope 1&2 Footprint and outsourced distribution and transportation emissions" within the remainder of the report.

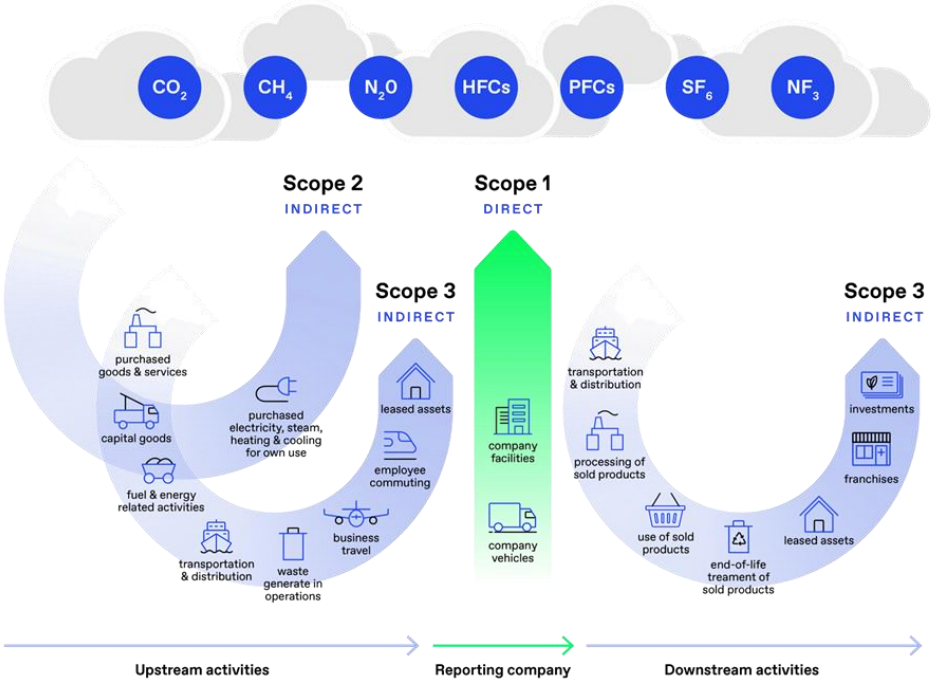
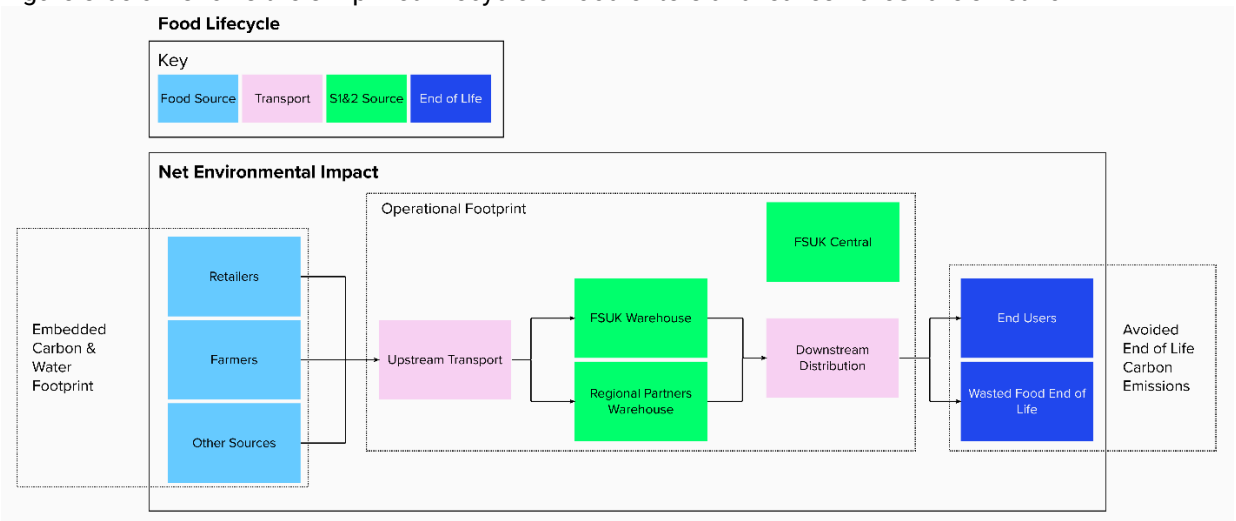


Figure 2: Greenhouse Gas Protocol Scopes

The GHG emissions associated with the food waste avoided was analysed following Category 1 of the Greenhouse Gas Protocol on Corporate Value Chain (Scope 3) Accounting and Reporting Standard. The embodied water was analysed following the Water Footprint Assessment Manual. The impact of avoided food waste will be referred to as the "Embedded Environmental Impact of Redistributed Waste Food".

2.1. Scope & Boundary

Figure 3 below shows the simplified lifecycle of food enters and leaves FareShare's network.



The embodied environmental impact of FareShare's redistribution operations calculated each products cradle-to-gate lifecycle along the first three segments; the gate boundary is defined as the moment they enter FareShare's network. This boundary also includes any upstream transport that may occur in the food items' life cycle.

2.2. Methodological Changes Since Previous Report

The organisational footprint has extended its scope to include not only the FareShare UK sites but all 32 network partner sites, including these organisational and third-party transport emissions. Refrigerants were included within the scope, which is an improvement since the previous analysis was conducted. The methodology was quite high level due to the level of data quality received, however this improved the accuracy of the footprint overall as all emission sources were included.

Figure 3: Redistributed food waste lifecycle

The main difference between the two analyses is covered in Section 5, which is the avoided end of life emissions of keeping redistributing surplus waste food. This has also affected the overall environmental impact of FareShare, as it has expanded the boundary to which avoided emissions are included.

3. Organisational Footprint

3.1. Scope & Boundary

This includes FareShare's Scope 1 and 2 Emissions as well as the outsourced downstream distribution. The inclusion of scope 3 categories relating to outsourced transportation and no other scope 3 categories was due to the functional unit chosen, which was kg redistributed surplus food. This meant only direct attributable emissions were included within the boundary. For example, scope 3 category 6 Business Travel was excluded as this is not a direct activity required to redistribute the surplus food.

3.2. Data Sources

3.2.1. Activity Data Sources

The activity data supplied by FareShare is broken down in Table 1 below. The table also includes the approach taken to calculate the emission. The different approaches will be discussed in the relevant sections.

FareShare's data category	File Name	Approach Taken
Natural Gas	22-23 EIA Data Collection - Master Sheet - Updated 2023-05-11	Main: Usage-approach Second: Spend-approach
Electricity		Main: Usage-approach

		Second: Spend-approach
Refrigerants		Main: Refrigerants Lost approach (estimated approach)
Company Vehicles		Main: Distance Approach Second: Proxy Approach
3rd Party transport		Main: Distance Approach
Logistics provider Data	• FareShare Transport Data Compiled FY 22-23 • Brakes FareShare 22-23 • Chill Chain FareShare Emissions March Calculations Report • Carbon footprint Job Stage and Load Miles 01.04.22 to 8.02.23 • Palletforce Emissions Data w Postcodes & Distance	Main: Distance Approach Second: Estimated Approach

Table 1: FareShare's Organisational Activity Data

Secondary data was used to fill in missing gaps in the data provided by FareShare. The links are shown in Table 2. This secondary data was chosen as primary data was not available in the data collection time period of this project. The Electricity source was used as it was a government source which told us the price of a kWh to allow us to incorporate the spend data into the model. This allowed the primary data to be supported by the secondary data source.

Data Category	Source
Refrigerants	Environmental Reporting Guidelines (publishing.service.gov.uk)
Electricity and Gas	https://www.gov.uk/government/statistical-data-sets/gas-and-electricity-prices-in-the-non-domestic-sector

Table 2: Secondary Data for Organisational Footprint

3.2.2. Emission Factor Sources

Emission Factor	Source
Electricity	BEIS 2022

Natural Gas	BEIS 2022
Diesel	BEIS 2022
Vehicles	BEIS 2022
Fugitive Gases	BEIS 2022

Table 3 Emission Factor Sources

Data Quality Assessment

Network Partner	Natural Gas	Electricity	Other Stationary	Vehicles	3rd Party	Hauliers	Refrigs.
FareShare Cymru							
FareShare Northern Ireland							
FareShare Yorkshire		Yorkshire					
FareShare Glasgow & the West of Scotland		Edinburgh					
FareShare Lancashire & Cumbria							
FareShare Hull & Humber	Hull						
The Felix Project	Felix West	Felix East					
FareShare North East	Newcastle	Newcastle					
FareShare South West							
FareShare Sussex & Surrey		Brighton					
FareShare Tayside & Fife							
FareShare Kent							
FareShare Greater Manchester		Openshaw					
FareShare Grampian	Aberdeen	Aberdeen **Alness**					
FareShare South Midlands							
FareShare Thames Valley							
FareShare Midlands	Narborough, Birmingham, Leicester	Lincoln, Narborough, Birmingham Leicester, Nottingham					
FareShare Central & South East Scotland							
FareShare UK East of England (Ipswich)							
FareShare UK Southern Central (Southampton)							
FareShare UK Merseyside							

	Data not provided at all
	Data not based on usage (more estimations used)
	Data not fully provided (e.g. not 12 months or specific allocation for all sites)
	Good Full data provided

Figure 4: Data quality Assessment Organisational Footprint

Above is a data quality assessment which outlines the activity data provided by Fareshare. The Green Key shows good full primary data provided. The Yellow Key indicates that some data was missing such as electricity data being usage data but not the full 12 months period. Therefore, for the missing months this data was extrapolated using an average of the other data provided. The orange key highlights large amount of data missing which involved different methodological approaches to be used such as a spend based approach, proxy emission factors and secondary data methodology. This leads to more estimation and a less accurate footprint. Furthermore, the red key highlights where no data had been provided so the kg of food approach was taken to allocate the emissions for this part of the organisational footprint.

3.3. Methodology Approach

Based on the data accessibility, availability, and quality, a mix of consumption and spend based approaches were applied to calculate the annual energy consumption, fuel use emission, refrigerant

emissions and emissions derived from transportation and distribution services that FareShare purchased.

3.3.1. Scope 1

FareShare's scope 1 emissions are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by FareShare. For FareShare this means combustion from their owned or leased vehicles, natural gas consumption, diesel consumption and fugitive emissions.

- Owned or Leased Vehicles

The combustion from FareShare's owned or leased vehicles was provided in a MS Excel data collection sheet which detailed the total amount of fuel purchased and used for company owned vehicles. To calculate the upstream emissions of purchased fuel a fuel-based approach was used by adopting the equation shown in equation 1. By applying the appropriate Scope 1 BEIS 2022 emissions factor, the footprint reflects an estimate for the CO2e emissions associated with the vehicles that are leased and/or owned by FareShare.

Equation 1:

$$Fuel\ CO_2e\ emissions = fuel\ litre\ usage * BEIS\ conversion\ factor$$

These factors are detailed on the "BEIS – emission factors" tab within the model. By using the Scope 1 emission factor for fuels, the footprint is compliant with a product carbon footprint methodology and therefore a fair comparison with the product footprint approach for the collected food. The Category 3 tab calculated the scope 3 Well to Tank emissions but these were kept separate to prevent double counting. Biofuel Diesel was used for the emission factor which is an assumption taken from the fact the employees fill the fuel up at petrol stations.

- Natural Gas and Diesel

Other scope 1 emissions include Natural Gas and other fuels used on site such as diesel. Similarly, FareShare provided a MS Excel data collection file showing the total amount of kWh of natural gas and the litres of diesel used per Network Partner. If a full breakdown per month per site was not available, the annual natural gas consumption was provided. If data was missing then natural gas was estimated, based on average usage over the data that had been provided to reflect a full year usage.

This data was allowed a usage-based approach to be adopted. For a usage approach, the emissions were calculated based on kWh Natural Gas consumed or litres of diesel consumed. Subsequently, BEIS conversion factors for 2021/2022 have been used to calculate upstream emissions of purchased natural gas and diesel. This calculation is shown in equation 2 and 3 below. These factors are detailed on the "BEIS – emission factors" tab within the model.

Equation 2:

$$\boldsymbol{Natural\ Gas\ CO_2e\ emissions = Natural\ Gas\ average\ kWh\ usage * BEIS\ conversion\ factor}$$

Equation 3:

$$\boldsymbol{Diesel\ CO_2e\ emissions = Diesel\ average\ kWh\ usage * BEIS\ conversion\ factor}$$

When the data was not available from invoices the client provided the data in GBP £ which meant a spend base approach was used. This method was based on the total spend of natural gas; the kWh was calculated by using the average natural gas per pence per kWh from GOV.UK website shown in the table above. This involved dividing the total spending by the p/kWh value to give the total kWh for the network partner. This was then extrapolated to create an estimated annual natural gas energy consumption of this site. This is shown in equation 4 below. By applying this method, the model reflects an estimate which is less accurate than based on actual kWh. Subsequently, the result for this approach currently shows an estimate, based on this, BEIS Scope 1 emission factors were applied. By applying the emission factors, it reflects the kg-CO2e emitted.

Equation 4:

$$\boldsymbol{Natural\ Gas\ \ CO_2e\ emissions = \left(\frac{Natural\ Gas\ spend}{average\ p/kWh\ per\ supplier}\right) * BEIS\ conversion\ factor}$$

- Fugitive Emissions

For fugitive emissions FareShare provided a data collection sheet which detailed the type of refrigeration each Network Partner had. Some Networks Partners were able to provide the refrigerant type and the amount of leakage. Therefore, a quantity-based approach was used shown in Equation 5.

Equation 5:

$$\boldsymbol{Refrigerants\ Lost(kg) = Refrigerant\ Added(kg) - Refrigerants\ Recovered(kg)}$$

$$\boldsymbol{Refrigerants\ \ CO_2e\ emissions = Refrigerants\ Lost(Kg) * BEIS\ conversion\ factor}$$

Whereas for some of the network partners the refrigerant data was hard for the client to provide so the type of refrigerant and the amount of leakage was not provided for all network partners. This involved a

more estimation approach to be taken with the use of secondary data. This secondary data was from the refrigerant methodology environmental reporting guidelines, and this provided the leakage for different types of fridges or freezer. Another assumption was if the refrigerant was unknown, then R404a and HFC 134a were used as these are the most common refrigerants.

3.3.2. Scope 2

Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity. FareShare's only has purchased electricity within their scope 2. Electricity consumption is calculated using usage based and spend base approaches.

FareShare provided a MS Excel data collection file which showed either the total amount of kWh of electricity or the total spend on purchased electricity for each Network Partner. For locations where kWh was provided a usage approach was used. The data was either provided as a breakdown per month or the total annual electricity consumption per site. If electricity data was unavailable this was estimated based on average usage over the data period that had been provided, to reflect a full year usage. Emissions were calculated based on kWh electricity consumed multiplied by the BEIS conversion factors for 2021/2022 shown in the equation below. These factors are detailed on the "BEIS – emission factors" tab within the model.

Equation 6:

$$\boldsymbol{Electricity\ CO_2e\ emissions = Electricity\ average\ kWh\ usage} * \boldsymbol{BEIS\ conversion\ factor}$$

If kWh data was unavailable, then the total financial spend on kWh of electricity was provided which allowed a spend based approach to be used. The total financial spend on kWh of electricity per Network Partner was divided by the average kWh of electricity per pence from GOV.UK website shown in the table above. This was then extrapolated to create an estimated annual electricity energy consumption of this site. This gave the kWh of consumption per Network partner this was then multiplied by the BEIS full life cycle emission factor to give the total CO2e Emissions shown in equation 7. By applying this method, the model reflects an estimate which is less accurate than based on actual kWh.

Equation 7:

$$\boldsymbol{Electricity\ \ CO_2e\ emissions} = \left(\frac{\boldsymbol{Electricity\ spend}}{\boldsymbol{average\ p/kWh\ per\ supplier}}\right) * \boldsymbol{BEIS\ conversion\ factor}$$

3.3.3. Outsourced Transportation

FareShare provided a data collection file showing the total amount fuel usage data, distance travelled, and tonnes of goods transported for outsourced transportation per Logistics provider and third-party transport per network partner. Emissions derived from purchased fuel consumption were calculated using BEIS emission factors 2021/2022, as shown in equation 8 below:

Equation 8:

$$\boldsymbol{Distance\ CO_2e\ emissions = Weight\ of\ food\ transport\ (tonnes)} * \boldsymbol{km\ travelled} * \boldsymbol{BEIS\ conversion\ factor}$$

The information from the data collection file provided the tonnes of food transport per km. The file also provided the transport vehicle and the weight of goods transported. This was then converted into tonnes km so the correct emission factor would be allocated to the correct journey. These factors are detailed on the "BEIS – emission factors" tab within the model. By applying the appropriate emissions factor, the footprint reflects an estimate for the CO2e emissions associated with the vehicles that are leased and/or owned by FareShare. By using full life cycle for fuels for scope 1 and outsourced transportation and distribution, the footprint is compliant with a product carbon footprint methodology and therefore a fair comparison with the product footprint approach for the collected food.

If the client was unable to provide the distance the tonnes of food transported travelled, then an assumption was made. This method used the emission factor created by using the tonnes of food transport from the full data provided and divided this by the total tonnes of CO2e to create an emission factor which could be applied to the tonnes of food without km distance. The client provided a breakdown of the types of vehicles used with the main assumption being that most of the transport was refrigerated. This method was used for 84% of the food transported as only 16% of the data included some transport distances to do the tonne km calculation.

3.4. Key Assumptions

When FareShare was unable to provide full data, we made some assumptions on the data provided. The assumptions are detailed in Table 4 below as well as in the front of the model.

Table 4: Assumptions on the Organisational Footprint

Network Partner (if applicable)	Emission Source	Description
Newcastle, Narborough, Edinburgh, Birmingham, Leicester	Natural Gas	All these sites did not have metre readings, so we used spend data and the secondary data Gov.UK source to provide Pence per kWh to work out the usage.
Aberdeen, Felix West, Hull	Natural Gas	For these sites not all 12 months of data could be provided so an average was worked out for each month and then applied to fill the gaps.
Newcastle, Openshaw, Lincoln, Narborough, Nottingham, Birmingham, Leicester	Electricity	All these sites did not have metre readings, so we used spend data and the secondary data Gov.UK source to provide Pence per kWh to work out the usage.
FareShare Yorkshire	Electricity	FareShare Yorkshire said they had a green tariff but did not specify therefore I used a proxy from one of the other FareShare providers.
Speke	Electricity	Did not specify which British Gas contract so just used the other British Gas common tariff provided by another provider.
Overall methodology	Electricity	If no tariff was provided, then the UK residual Tariff was used.

Edinburgh, Felix East, Aberdeen, Brighton	Electricity	For these sites not all 12 months of data could be provided so an average was worked out for each month and then applied to fill the gaps.
Alness	Electricity	No data was provided for this site therefore to get a result a weighted average was worked out. This involved using the kg food per kWh, this took into consideration the amount of food that Network Partner transferred and then this was used to work out the % of energy this site would have used
Overall methodology	Refrigerants	If the refrigerant was unknown, then R404a and HFC 134a were used as these are the most common refrigerants.
Overall methodology	Refrigerants	If the refrigerant quantity data was not known, then the refrigerant methodology environmental reporting guidelines were used (in table 2), and this gave the usage for the type of fridge or freezer.
Overall methodology	3rd Party Transport	The distance was provided per journey, and the number of journeys were provided therefore the number of journeys were times by the distance for each journey.
Overall methodology	Company Vehicles	FareShare provided the types and number of vehicles and in a different tab they provided fuel usage. If the breakdown of fuel didn't match the number of vehicles an average was used and divided equally across the vehicles for that network Partner site. The assumption is the centre may have a few fuel cards.
Overall methodology	Company Vehicles	For the electric vehicles unless provided separately (such as Felix Project and Sussex and Surrey) it was assumed that kWh for charging these vehicles were already included in the total purchased energy for the Network Partner Site
Overall methodology	Transport logistics provider	Type of Vehicles is not always provided then an assumption on the type of vehicle was taken. If specific were not provided then all articulated, all HGVs or All rigid was used. This was based on the information provided and the other transport for that logistics provider
Overall methodology	Transport logistics provider	The fuel type was not provided so average laden was used for the calculations
Overall methodology	Transport Logistics provider	To work out the emissions per impact partner for logistics provider a KG of FOOD transport was used to allocate the emissions.
Overall methodology	Transport Logistics provider	For LLD the Food was food was allocated per network partner and this was added onto the average network partner transport logistics provider emissions separately

Overall methodology	Transport Logistics provider	Some of the Brakes data did not have tonne weight so the location was provided so other weight were used for sites which went to the same site.
Overall methodology	Transport Logistics provider	Only 21% of the data was primary therefore 79% was a proxy which used the kg of food transport from the 21% to create an Emission Factor which could be applied to the kg of food for the 84% which had no distances.
Overall methodology	Company Vehicles	The EF used it the Biofuel Diesel as it is filled up at petrol stations.

4. Embedded Environmental Impact of Redistributed Waste Food

4.1. Scope & Boundary

The embedded environmental impact of FareShare's redistribution operations calculated each products cradle-to-gate lifecycle, which includes raw material production, processing and distribution. With the gate boundary is defined as the moment they enter FareShare's network. This boundary also includes any upstream transport that may occur in the food items' life cycle.

4.2. Data Sources

4.2.1. Activity Data Sources

The data files provided by FareShare included the data for all food coming into and leaving FareShare's network as well as any waste within the network itself. This included the mass, food categorisation, the suppliers and the logistics provider.

The food categorisation data included all the food items that FareShare have received and distributed within its system throughout the reporting year of FY 2022, as well as any wastage. There was also categorisation of the reason the food entered FareShare's network, whether it was surplus on non-surplus food.

Total FareShare data for the reporting period was provided by FareShare in the following files:

Table 5 Data sources Relating to the environmental impact.

Relating to	File Name
Food Categorisation	Food Out V2.xl

4.2.2. Emission Factor Sources

Cradle-to-grave emission factors that incorporate upstream transport were used to calculate the avoided emission of food items. These emission factors were sourced from Carbon Trust databases compiled from a literature review[1].based on the UK industrial average data.

The embedded water consumption of the food waste was calculated using water factors from research undertaken by the Water Footprint Organisation and UNESCO-IHE[2] [3].

4.3. Methodology Approach

4.3.1. Carbon Emissions

Carbon Trust provided FareShare with a list of emission factors that have been developed internally, FareShare then completed an exercise that matched their food categories with these emission factors. 100% of food was categorised with an appropriate emission factor.

Although FareShare provided data for the mass of each food category coming into, leaving and wasted within FareShare's network, only the food leaving was considered. As this was the most credible piece of data that detailed how much food was actually redistributed by FareShare as there was discrepancies between the waste mass, food in and food out. Only food that was labelled as "Surplus" was also only considered as this food has been classified as waste food rather than donated or purchased.

The food categorisation to the Carbon Trust's emission factors allowed for the calculation as detailed below.

$$\boldsymbol{CO_2e\ Emissions\ of\ Embedded\ Food\ Waste = activity\ data \times emission\ factor}$$

Equation 9: Emissions related to embedded food waste.

The calculations followed the GHG Protocol Corporate Value Chain Standard methodology.

4.3.2. Water Footprint

Due to the nature of water footprints and the research around water factors, the embedded water footprint was calculated to a higher level than the carbon footprint. By mass, 35% of FareShare's stock was categorised to match existing water factors, which mainly consisted of meat, fruit, vegetables, and other crops. Similarly, to the carbon footprint the food's mass was multiplied by the corresponding water factor to find the overall embedded water in m^3.

The proportion of each food category within the categorised stock was calculated, this allowed for a weighted average of the water factors used to be found. This water factor was then applied to the remaining 65% of the stock that could not be assigned to a specific water factor.

Similarly, to the carbon footprint only surplus food and food that had left FareShare's network were considered.

4.4. Key Assumptions

The packaging End-of-Life (EoL) emissions did not require modelling as these emissions would be the same regardless of if FareShare redistributed the food items or not, so these emission factors were not applied to the avoided carbon emission calculations.

That the emission factor categorisation was done to an appropriate standard.

That the water factor categorisation was done to an appropriate standard.

5. Avoided End of Life Emissions of Redistributing Waste Food

The following section describes the methodology taken to calculate the avoided emissions of FareShare's operations. However, it must be noted that FareShare does not support the assumption that 1 tonne of redistributed food avoids the purchase of 1 tonne of equivalent food. This assumption was used as it represents the theoretical maximum emissions that FareShare can avoid. The Carbon Trust accepts FareShare's position.

Methodology and assumptions throughout this section are based on the Verified Carbon Standard – Methodology for avoiding greenhouse gas emission by keeping food in the human supply chain V1 08.03.22.

A summary of useful definitions are as follows:

Biogenic CO2

CO2 emissions deriving from the respiration of organic matter by bacteria (biological processes) or its oxidation through physic-chemical processes (e.g., combustion or pyrolysis). Fast-cycling biogenic CO2 emissions are considered climate neutral.

Food

This methodology uses the term "food" to refer broadly to all parts of plants, fungi, and animals — whether processed, semi-processed, or raw— that could be eventually eaten by humans.

Food Loss and Waste (FLW)

For this methodology specifically, "food loss and waste" and the acronym FLW refer to food (and any associated inedible parts) that goes to any FLW destination.

FLW Destination

Refers to where food goes when removed from the human food supply chain. For example, landfill, anaerobic digestion, composting, energy recovery.

Recovered Food

Food that has been kept in the human food chain because of the project activity; includes activities that focus on “prevention” (stopping food from being discarded in the first place) as well as “rescue” (redistributing to people food at risk of being discarded).

5.1. Scope & Boundary

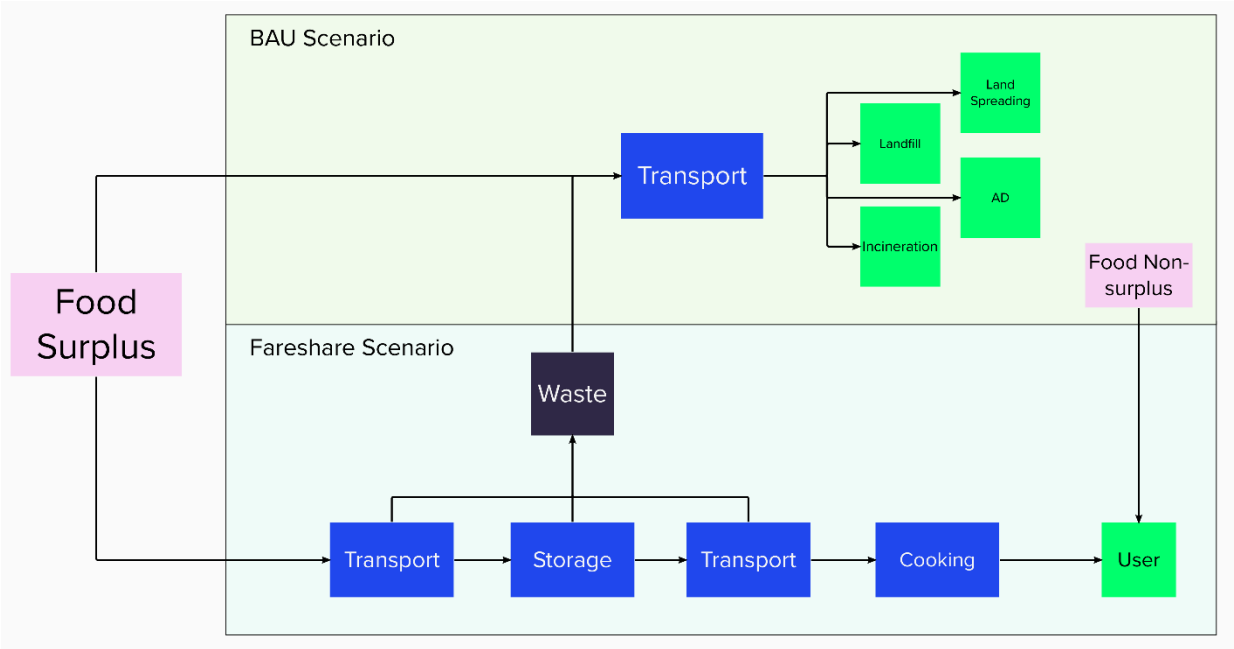
The scope of this project is to assess the amount of avoided greenhouse gas emissions from FareShare activities by keeping food in the supply chain that otherwise would have been sent to a FLW destination.

The project boundary encompasses the region (UK) where food ends up (the FLW destination) under the baseline scenario, as well as the region (UK) where the recovered food is used or consumed because of the FareShare’s activities (if different from that of the baseline scenario). Taking a conservative approach, only ‘surplus’ food supplied to FareShare is included in the model to better ensure this food was genuinely at risk of leaving the human supply chain.

a. Baseline emission sources (BAU)
The main baseline emissions accounted for under this methodology are associated with the treatment of food in the FLW destination. Emissions from transport activities to the FLW destination have also been included.

b. Project emission sources (FareShare Scenario)
GHG emissions from food transport and processing (e.g., additional food processing to convert the food recovered into new food products, or further transportation activities, like home delivery).

Activities excluded from the project boundary are those that would continue to occur as part of typical food storage, handling, cooking and consumption, such as refrigeration or freezing, cooking, digestion of food and treatment of human excreta, and discarding food (which is already covered by the leakage factor).



Think that’s

Figure 4: Process map of the Business as Usual & FareShare scenario that was analysed in the avoided emissions calculation.

5.2. Data Sources

5.2.1. Activity Data Sources

5.2.1.1. Business as Usual Scenario (BAU)

The data files provided by FareShare that have been included within the avoided end of life emissions model are related to food categorisation and the kilograms of the individual categories that are distributed.

The food categorisation data included all the food items that FareShare have received (Food in) within its system and food distributed (food out) throughout the reporting year. This file also included the mapping of FareShare's internal categories to Carbon Trust supplied categories. This enabled a biogenic carbon content (kg-C/kg) to be attributed to each category.

The FLW end of life destination percentage is sourced from a 2018 report from WRAP providing FLW end of life destinations for the general population, additionally Supermarkets have stated that zero food waste goes to landfill in their supply chain. Using the food in volume data by type of supplier (Supermarket, non-supermarket) an average BAU percentage split was created with the following values.

Table 6- Food Loss and Waste end of life destination (%) BAU

FLW Destination	Percentage
Landfill	27%
Energy Recovery or Land spreading	39%
Composting or Anaerobic Digestion	33%

The transport activity of Food Loss & waste to the end-of-life destination, was calculated using a proxy emissions figure from BEIS DEFRA emission factor database.

5.2.1.2. FareShare Scenario

The food categorisation data included all the food items that FareShare have received (Food in) within its system and food distributed (food out), and food sent to waste (food waste) throughout the reporting year. These files also included the mapping of FareShare's internal categories to Carbon Trust supplied categories. This enabled a biogenic carbon content (kg-C/kg) to be attributed to each category. Food loss and waste for each food category was calculated using the food waste data.

The FLW end of life destination percentages by network partner are based on evidence from data provided by the network partner. The key assumption is that no FLW went to landfill from any network partner.

Table 7- Food Loss and Waste End of Life Destination (%) - Fareshare Scenario

FareShare Partner	Landfill	Energy recovery or Land spreading	Composting or AD	Animal Feed
FareShare Central & South east Scotland		73%	27%	
FareShare Cymru				100%
FareShare South West			100%	
FareShare UK East of England (Ipswich)		73%	27%	
FareShare UK Southern Central (Southampton)		73%	27%	
FareShare UK Merseyside		73%	27%	
FareShare Glasgow & the West of Scotland		73%	27%	
FareShare Grampian			100%	
FareShare Greater Manchester			100%	
FareShare Hull & Humber		73%	27%	
FareShare Kent		73%	27%	
FareShare Lancashire & Cumbria			100%	
The Felix Project			100%	
FareShare Midlands		73%	27%	
FareShare North East		73%	27%	
FareShare Northern Ireland			100%	
FareShare South Midlands			100%	
FareShare Sussex & Surrey			100%	
FareShare Tayside & Fife			100%	
FareShare Thames Valley				100%
FareShare Yorkshire			100%	

The transport activity of food loss & waste to the end-of-life destination, was calculated using a proxy emissions figure from BEIS DEFRA emission factor database.

5.2.2. Emission Factor Sources

Table 8 Emission Factors

Emission Factor	Source
Biogenic carbon content (kg-C/kg)	Carbon Balances and Energy impacts of the Management of UK wastes- ERM and Golders Associates/

Biogenic carbon content (kg-C/kg)	Table 6 Verified Carbon Standard METHODOLOGY FOR AVOIDING GREENHOUSE GAS EMISSIONS BY KEEPING FOOD IN THE HUMAN SUPPLY CHAIN
Biogenic carbon content (kg-C/kg)	U.S. Environmental Protection Agency Office of Resource Conservation and Recovery -Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
Biogenic Emission Factor (kg-CO2e/kg)	Carbon Trust Biogenic Carbon Calculator V1
Processing emission factor (of raw food only categories)	Carbon Trust Home Cooking Calculator V4, BBC Roast calculator
FLW Transport to End of life destination	Modified - 2022 -BEIS DEFRA EF-Average Plastic Waste to Landfill

5.3. Methodology Approach

5.3.1. Business as Usual Scenario

FareShare supplied data food categorisation and the kilograms of the individual categories that were received (food-in) was compared by network partner.

The food categories were mapped to the biogenic carbon content/kg and average UK Food and loss waste end of life destinations using. Using Carbon trust Biogenic calculator v1, Net Biogenic Emissions (kg-CO2e/kg) were then calculated.

Total kilograms of each food category were multiplied by a standard transport to end of life emission factor from 2022 BEIS DEFRA EF database.

5.3.2. FareShare Scenario

FareShare supplied data food categorisation and the kilograms of the individual categories that were received (food in) and that are distributed (food out), and food that went to waste (Food Waste).

The total kg of food waste by category was used to calculated FLW endo of life emissions.

The food categories were mapped to the biogenic carbon content/kg and average FLW end of life destinations, provided by network partner. Using Carbon trust Biogenic calculator v1, Net Biogenic Emissions (kg-CO2e/kg) were then calculated.

Reprocessing emission for raw meat and fish categories, were calculated using an FPX cooking calculator v4.

Total kilograms of each food category were multiplied by a standard transport to end of life emission factor from 2022 BEIS DEFRA EF database.

Total organizational emissions from the organisational footprint were divided by kilogram of food in by network partner.

5.4. Key Assumptions

Table 9: Key assumptions End of Life

Reference	Assumption
Scope of boundary	A significant amount of GHG emissions is embodied in the production of food. Using and consuming a higher proportion of available food would therefore, in aggregate, generate reductions in production related GHG emissions. However, taking a conservative approach since GHG emissions associated with food supply chain emissions are difficult to prove as having taken place, this current methodology version only covers downstream emissions.
Food supplied to FareShare- Surplus	Only 'surplus' food supplied to FareShare is included in the model to better ensure this food was genuinely at risk of leaving the human supply chain.
Biogenic Carbon Content: Calculation	Carbon content was calculated using dry matter assumptions of each food category. In some cases, these dry matter % were sourced from US data.
Biogenic Carbon Content: Averages	Biogenic carbon content was calculated using data from footprint expert and USDA dry matter content. Where a food category did not explicitly match with the reference data averages of similar products were used.
Biogenic Carbon Content: Kitchen/Food waste	If there was no comparable Biogenic Carbon Content within the reference data. A proxy of Kitchen /food waste – EU was used

Food waste (kg)	Volumes from the 'Food Waste kg' by food category were used to calculate food loss and waste end of life destination emission for the Fareshare scenario
Food Loss and Waste Destination – BAU Scenario	That food waste is disposed of in the UK by the following proportion. Landfill 27%, Energy recovery/Land spreading 39%, Composting/Anaerobic digestion 33%. This is calculated using a standard waste destination figure sourced from WRAP Landfill 33%, Energy recovery 47%, AD 20%. And the assumption that any food sourced within the model from supermarkets would not be sent to landfill.
Food Loss and Waste Destination – FareShare Scenario	No network partners send FLW to 'landfill' or 'Incineration without energy recovery.'
Redistributed food	It is assumed that one tonne of surplus food prevents the purchase of one tonne of the equivalent food category.
Processing emission factor (of raw meat and fish food categories)	It is assumed that all raw meat products are required to be cooked (once distributed to be consumed) therefore a cooking emission factor has been used
Processing emission factor (of raw food only categories)- Cooking emission	It was assumed that for 1kg of raw meat or fish; An electric oven was used for 50% of cooking events with an average cooking time of 77mins. An electric hob was used for 50% of the cooking events. With an average cooking time of 40mins. Proportionally raw meat or fish constituted 50% of the cooked volume, 25% vegetables, 25% water.
Food loss and waste end of life transport emissions Factor	As biogenic emissions have been separately calculated by food category. An average plastic waste emissions factor has been used to calculate only the emission derived from transferring 1 tonne of food waste to the end-of-life destination

Food storage at FareShare	It is assumed that emissions related to storage of chilled or frozen food categories have already been accounted for within the organisational footprinting and so have not been calculated.
Food Categories - Pork, Beef, Lamb, Chicken, Turkey, Fish	Food Categories- Pork, Beef, Lamb, Chicken, Turkey, have been identified as precooked using secondary category data from source(s) reference: FareShare supplied- 'Food In by network partner' & 'Food out by Network Partner'. No cooking emission factor was attributed to this activity data.
Food Categories - Pork- Raw Beef- Raw, Lamb-Raw, Chicken- Raw, Turkey- Raw, Fish-Raw	Food Categories - Pork- Raw Beef- Raw, Lamb-Raw, Chicken- Raw, Turkey- Raw have been identified as supplied uncooked using secondary category data from source(s) reference: FareShare supplied- 'Food In by network partner' & 'Food out by Network Partner'. A cooking emission factor was attributed to this activity data

6. Results

Results Summary

FareShare's Organisational Footprint hotspots comes from their Scope 3 outsourced distribution accounting for 87%. When the emissions are split per Network Partner, the top Network Partner is the Felix Project which accounts 29%, followed by the FareShare Midlands at 15% and then FareShare Greater Manchester at 6%. These percentages nearly mirror the kg of food redistributed at these Network Partners with Felix being 30%, Midlands being 16% and FareShare Manchester being 5% of the overall organisational footprint. Therefore, as the kg of food redistributed is a key part of the methodology around the logistics provider and the logistics provider being the biggest part of the footprint (shown in figure 6), then the results allocation follows a similar pattern. Even though Midlands is a large site the electricity usage at this site is lower than expected which could be due to the data being provided as spend data rather than usage data which is a less accurate methodology. The total results also include two offices (Millbank Tower, Evelyn Court) the emissions of these are very small only 0.39tCO2e for Evelyn Court and 10.43 tCO2e.

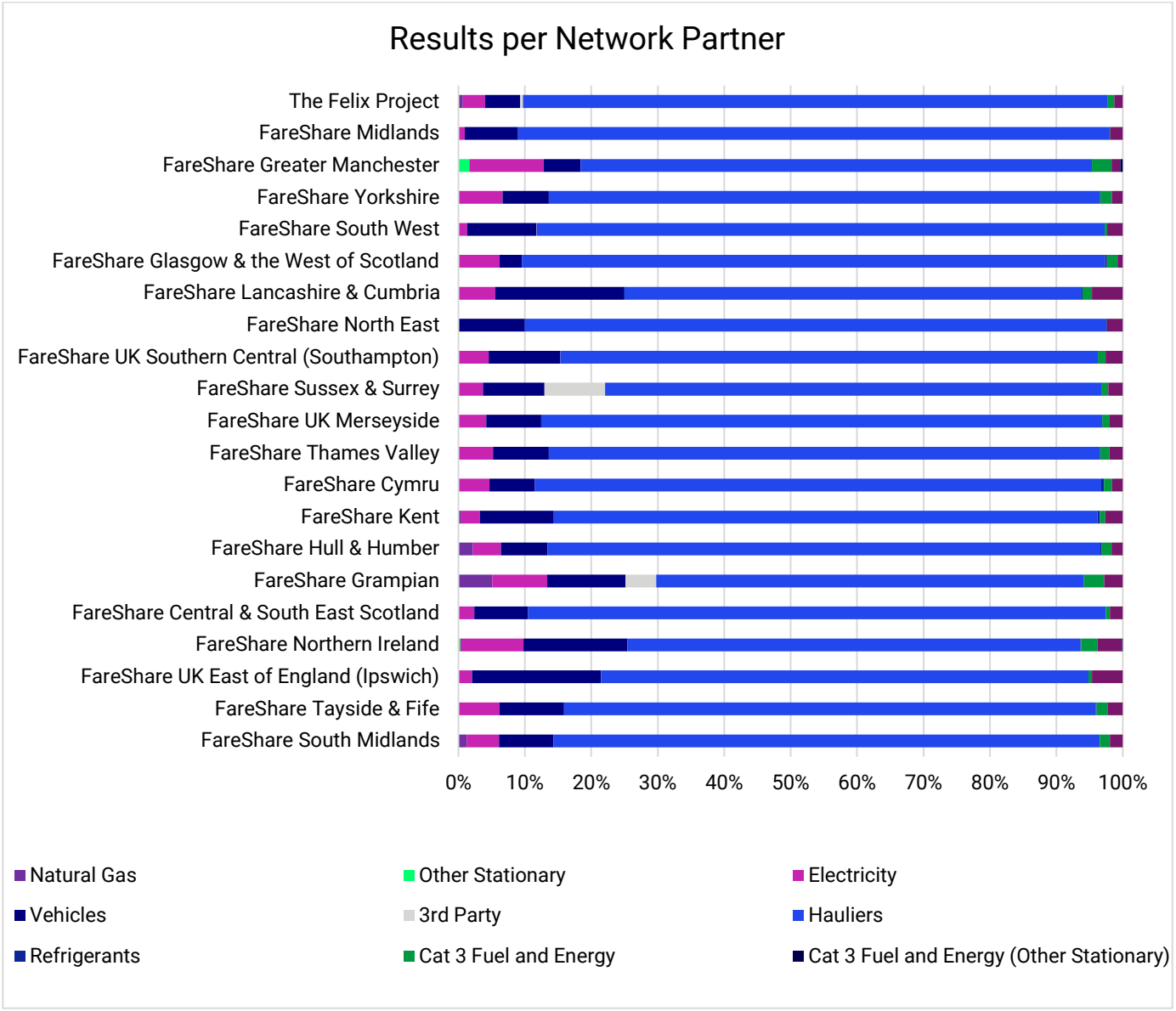


Figure 5: Results per Lifecycle stage per Network Partner

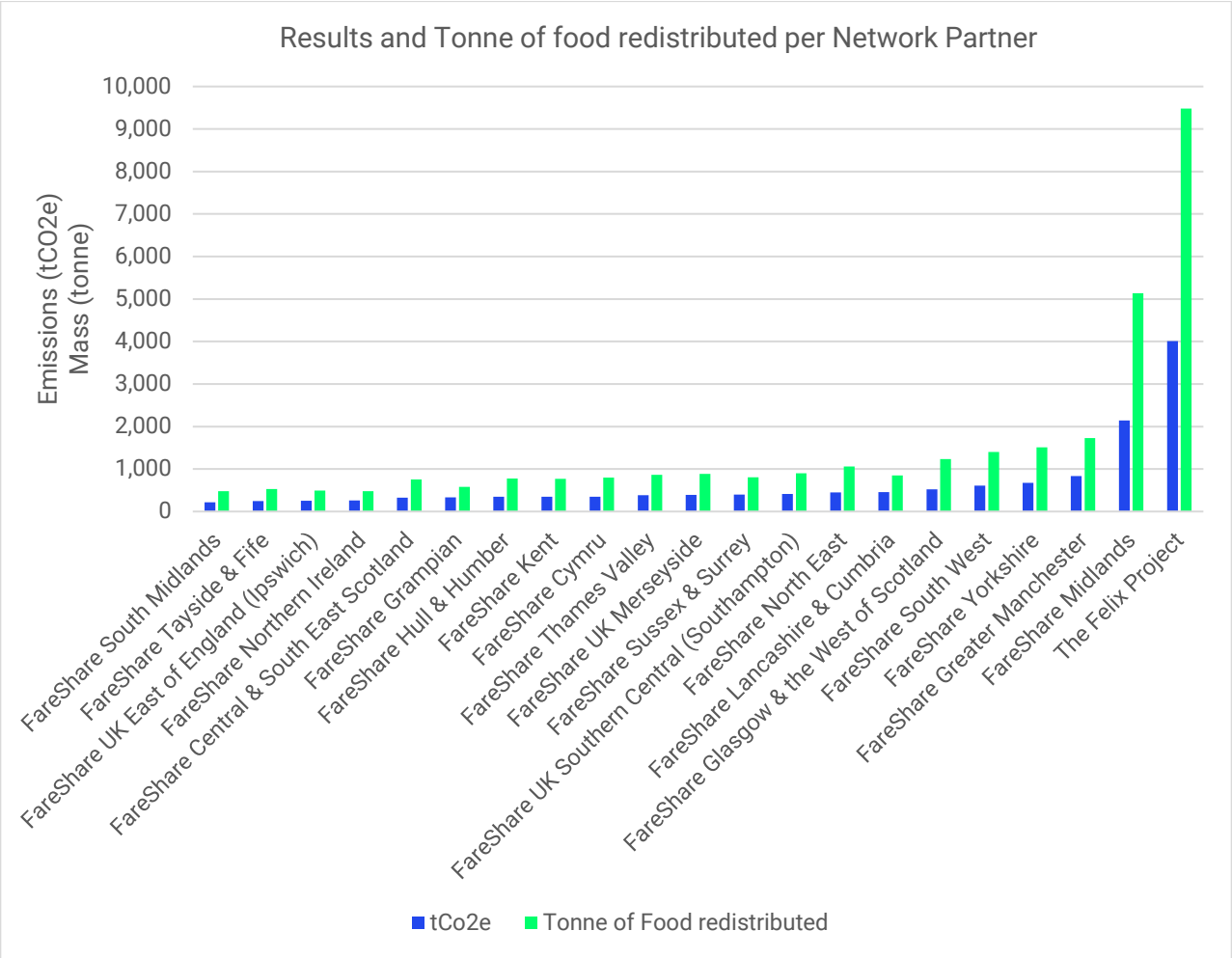


Figure 6: Results and Kg of food redistributed per Network Partner

6.1. Organisational Footprint

This section provides the results of FareShare's environmental assessment for both the Scope1&2 and outsourced transportation and distribution footprint and the environmental impact of the avoided food waste.

Overall, FareShare's own footprint shows that their Scope 3 emissions associated with outsourced transportation accounts for the vast majority of the CO2 produced by their own activities. If FareShare wanted to reduce their own emissions to increase their net environmental impact further, then their Scope 3 would be the most appropriate section to decrease.

The results of FareShare's overall Scope 1&2 and outsourced transportation and distribution footprint was 13,976 tCO2e (location based), with Scope 1 accounting for 9% and Scope 2 accounting for 4% and outsourced distribution and transportation for 87% of the total footprint. This can be put simply as the Scope 1 emissions are made up of the fuel consumption of FareShare's owned fleet, Natural Gas consumption, Diesel Consumption, Fugitive Emissions and the Scope 2 emissions was the electricity consumption of FareShare's sites and the scope 3 category outsourced transportation and distribution (third party transport and transport logistics providers) and Category 3 fuel and energy.

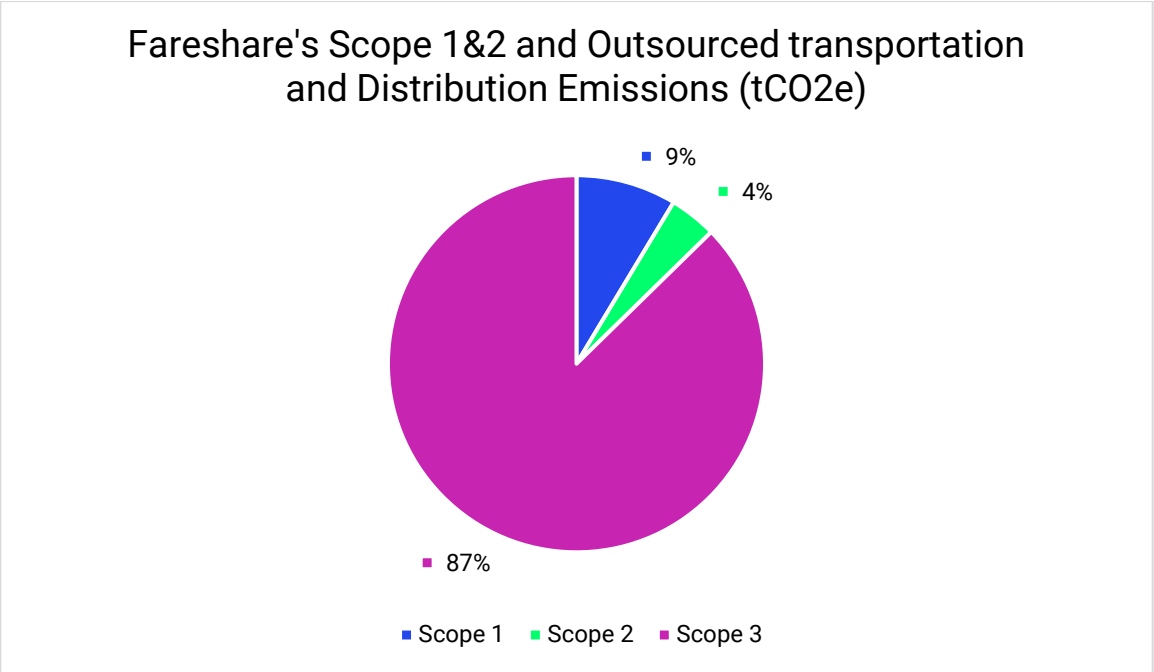
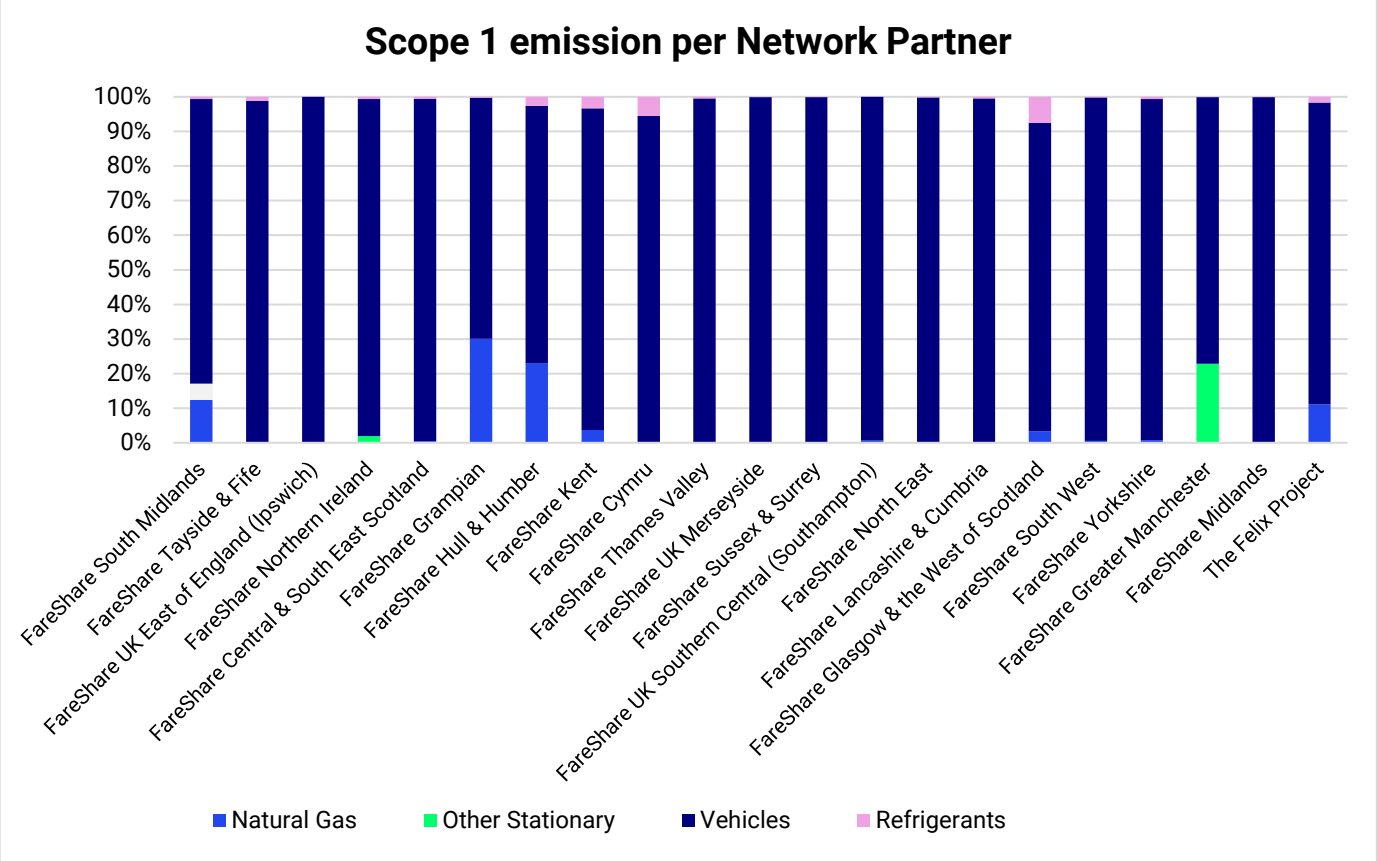


Figure 7: FareShare's Scope 1&2 and Outsourced transportation and Distribution Emissions (tCO2e)

6.1.1. Scope 1 Results



Scope 1 results are broken down into different emission sources, of which Natural Gas account for 5%, Diesel accounting for 3%, fugitive emissions account for 1% company vehicles account for 93% of the total footprint, resulting in 1205 tCO2e. Figure 5 shows the breakdown of Scope 1 emission per Network partner. This shows that company vehicles are the biggest contributor to FareShare's Scope 1 Emissions.

Figure 8: Scope 1 emission per Network Partner

6.1.2. Scope 2 Results

The scope 2 Footprint result is 567 tCo2e on a location-based approach and 360 tCo2e on a market-based approach. Figure 6 below details the proportion each site location accounted for within the Scope 2 footprint. The Network Partner with the highest scope 2 emissions was the Felix Project, totalling 134.29 tCO2e, 24% of the Scope 2 footprint.

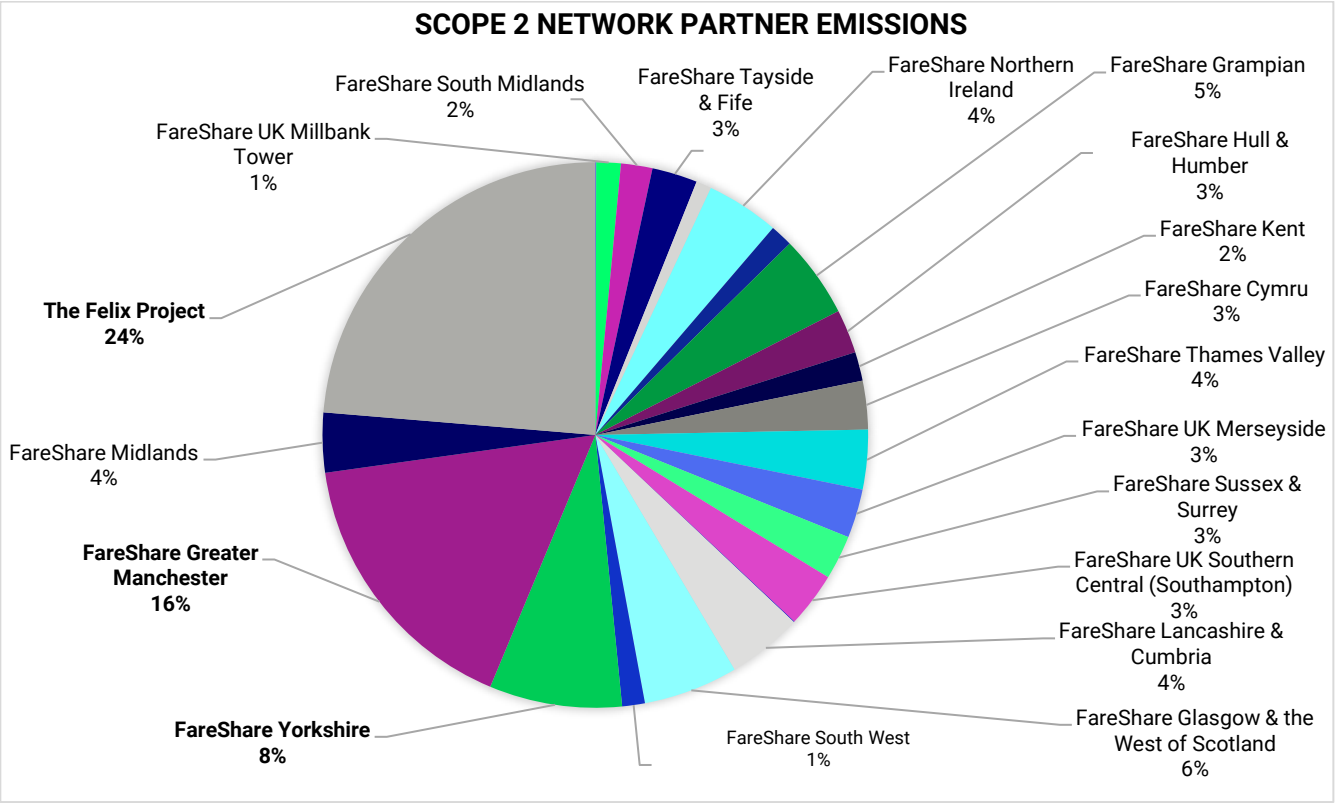


Figure 9: Scope 2 Results

For the scope 2 emission two methodologies were used, firstly the usage data which provided an accurate representation of the network partners site, however some sites where unable to provide this so spend data was used. This approach used a different methodology which has more uncertainty around the result. This could explain why FareShare Midlands emissions for scope 2 are quite low even though the site is one of the largest FareShare sites.

6.1.3. Scope 3 Emissions

The location-based and market-based scope 3 emissions total 12203 tCO2e which includes category 3 fuel and energy related activities, third party transport and transport logistics provider emissions.

Outsourced Transportation Results

The pie chart below portrays the carbon emission breakdown per logistics provider supplier. The total carbon footprint the transport logistics providers totalled 11710.14 tCO2e. Other covers 43% of logistics provider emissions followed by supplier fleet at 23% of the logistics provider emissions and then 'Langdons', covers 13% of the total outsourced transportation emissions.

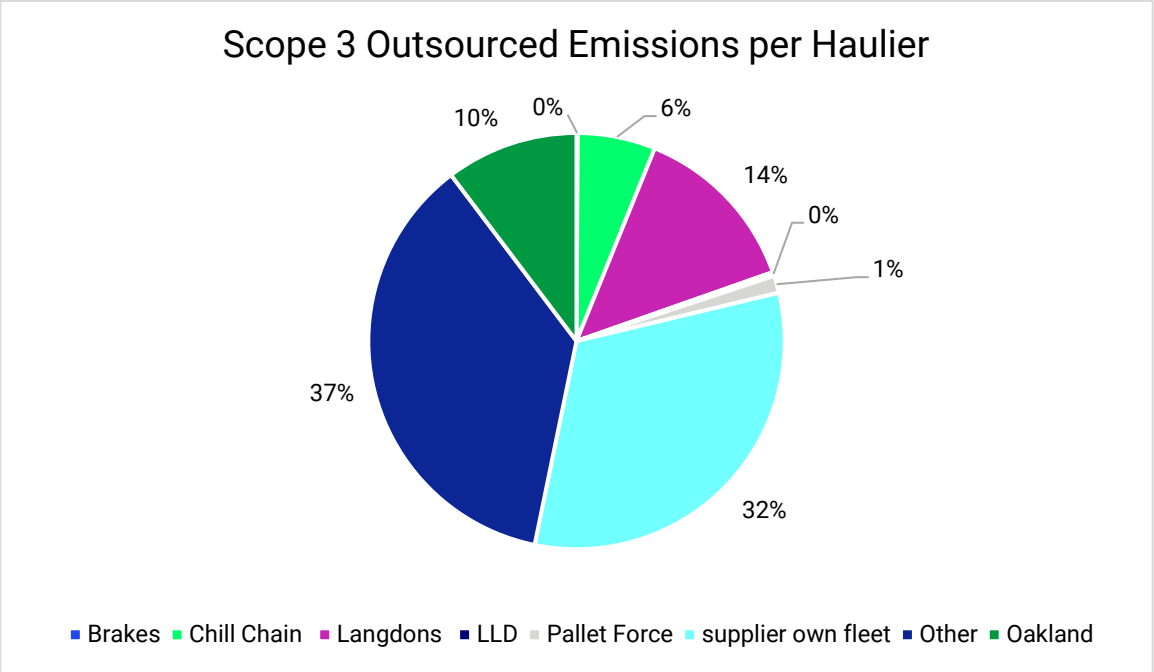


Figure 10: Scope 3 Outsourced Emissions per Logistics provider

For the Logistics provider data, we were provided a further breakdown of data from five sites which included Chill-Chain, Brakes, Langdons, LLD and Pallet Force. Langdons provided the best breakdown as they provided the weight of product transport and the distance in km of travel. They also had done their own tonne.km calculation which was used in the model. Some of the other providers such as Oakland, Supplier Own fleet and other food logistics providers did not provide any breakdown except for the kg of food transport. Therefore, emissions were estimated for these logistics providers to provide an insight into what their emissions could resemble. Due to high estimation this reduces the data quality and therefore accuracy of the logistics provider data.

6.2. Embedded Environmental Impact

6.2.1. Carbon Footprint Results

The overall carbon footprint of the food waste avoided by FareShare totalled 63,810,163 kg-CO2e, which came from 31,510,220 kilograms of food waste in total. So, for every tonne of food redistributed 2.03 tCO2e is also prevented from waste. Six food groups account for 50% of the CO2e emissions: Beef

(17%), Other Vegetables (9%), Ready Meals (8%), Coffee (7%), Pork (5%), and Cheese (5%). These were the only food categories that made up more than 5% of the overall emissions.

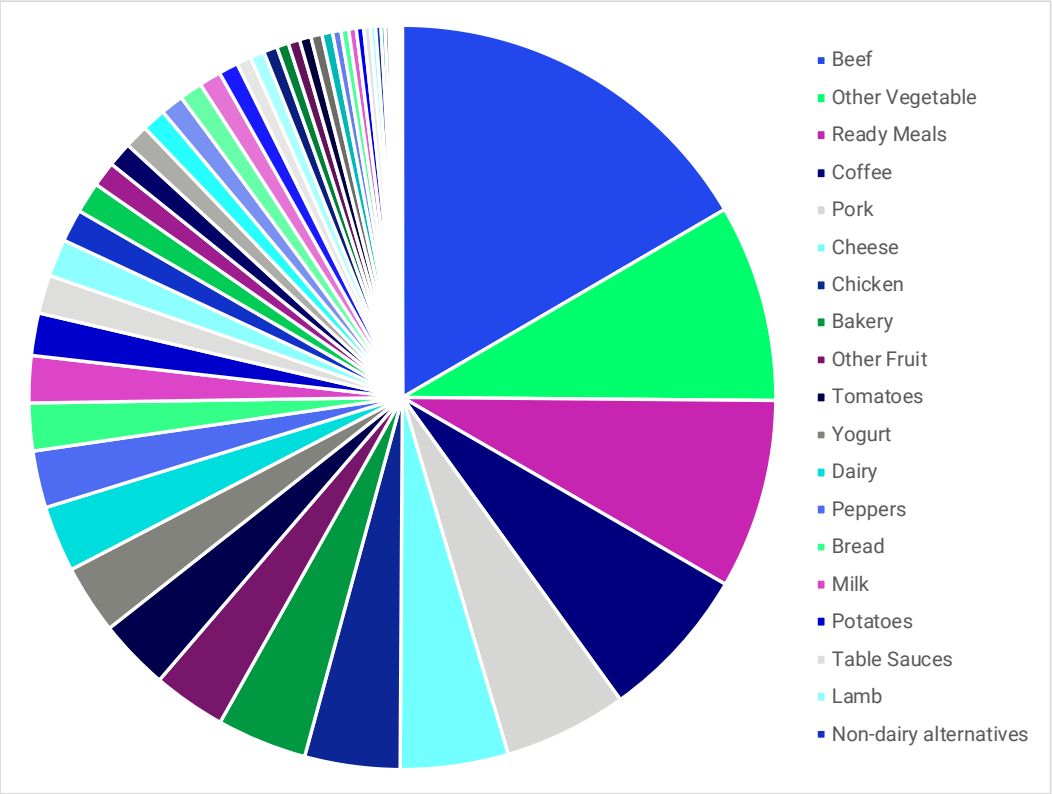


Figure 11: Carbon emissions (kg-CO2e) breakdown by primary food category

The figure below details the difference in the total emissions of the different primary food categories and their overall masses. The figure shows that despite making up a small proportion of food in terms of total mass, red meats such as Beef account for a large proportion of total CO2e emissions: Beef accounts for 1% of total mass but 17% of total CO2e emissions.

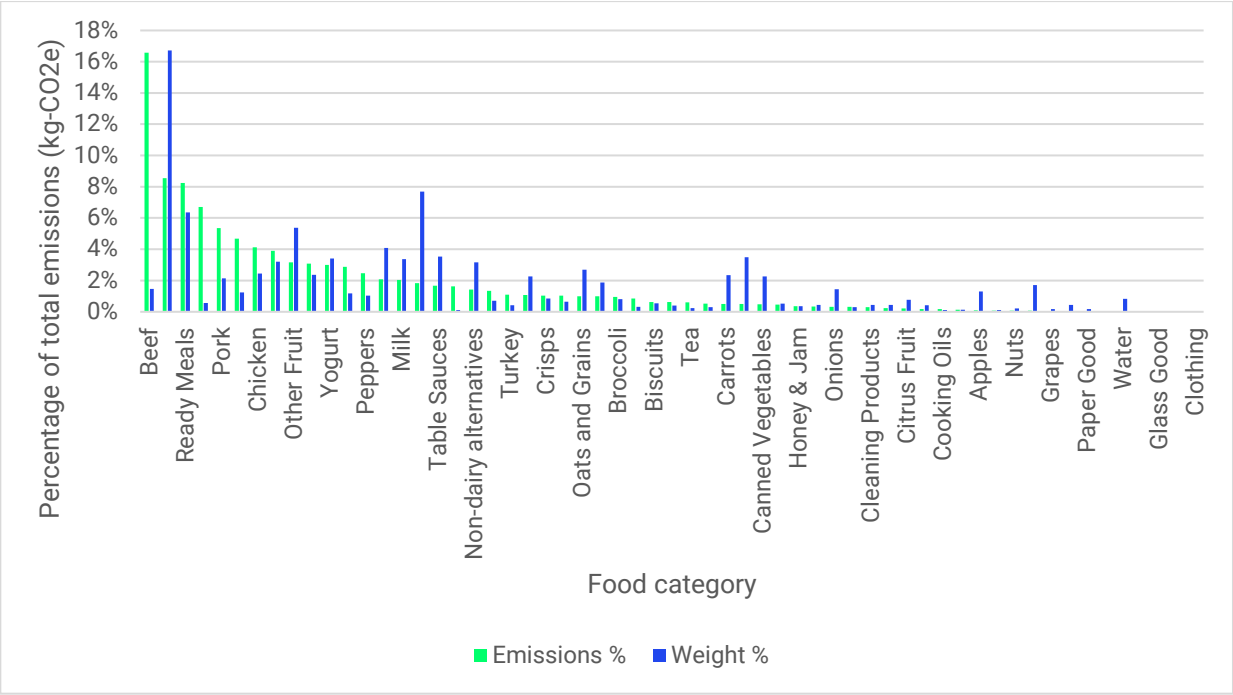


Figure 12: Proportion of total emissions (kg-CO2e) and proportion of total mass (kg)

6.2.2. Water Footprint Results

The total water footprint of the avoided food waste was 83,872,226 m^3 of embedded water from the same mass of 31,510,220 kilograms of food waste in total, so for every tonne of food redistributed 2.66 million litres is also prevented from waste. The largest category for the water footprint was Ready Meals (8,439,285 m^3), totalling 10% of the water footprint. This was followed by Beef (8%), and Fruit, Table Sauces, Yoghurt, Bakery, and Non-Dairy Alternatives, which all accounted for 6% of the water footprint. All other categories accounted for 5% (Pork) or less of the water footprint.

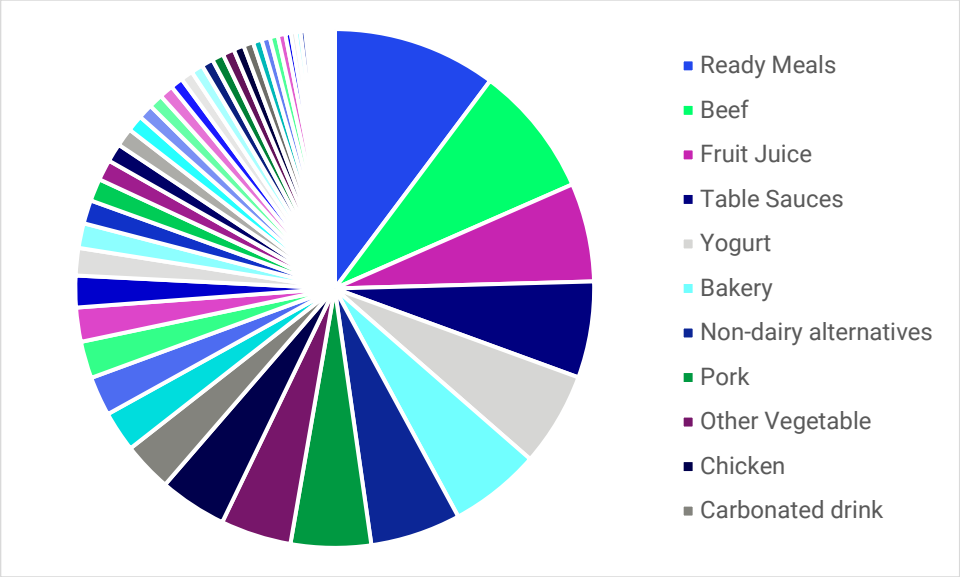


Figure 13: Water footprint (m^3) breakdown by primary food category

As can be seen in Figure 14, the differences in the proportion of overall mass and embedded water of the different primary food categories are great. The water intensity for dairy, meat, and other processed food outweighs that of fruits and vegetables. Even though Other Vegetables make up 17% of total mass and Beef makes up 1%, Other Vegetables account for 4% of the embedded water footprint, whilst Beef accounts for 8%.

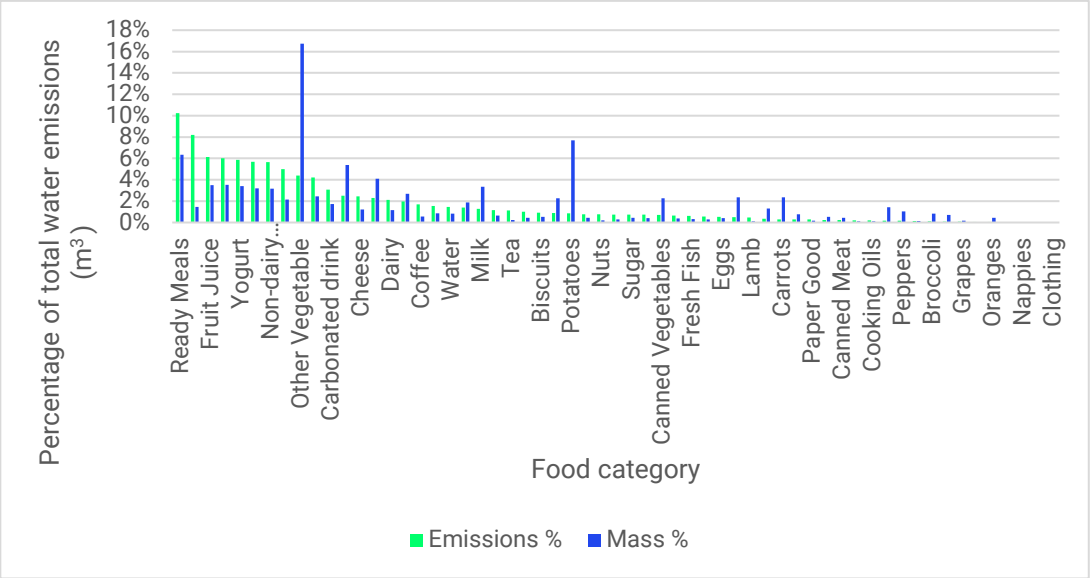


Figure 14: Proportion of the total mass (kg) and embedded water (m^3) by primary food category

6.3. Avoided End of Life Emissions

We are presenting the results of the avoided emissions exercise below, however it should be noted that FareShare does not support the assumption that 1 tonne of redistributed food avoids the purchase of 1 tonne of equivalent food.

6.3.1. Results

By redistributing surplus food that would have been sent to an end-of-life destination, and considering embedded food footprint and these end-of-life emissions, FareShare's actions enabled the avoidance of up to 60,678 tCO2e during the period of 1st April 2022-31st March 2023.

The equation to calculate the overall avoided emissions is as follows:

$$Avoided\ emissions = Embedded\ food\ emissions + BAU\ sceanrio\ end\ of\ life\ emissions - FareShare\ scenario\ emissions$$

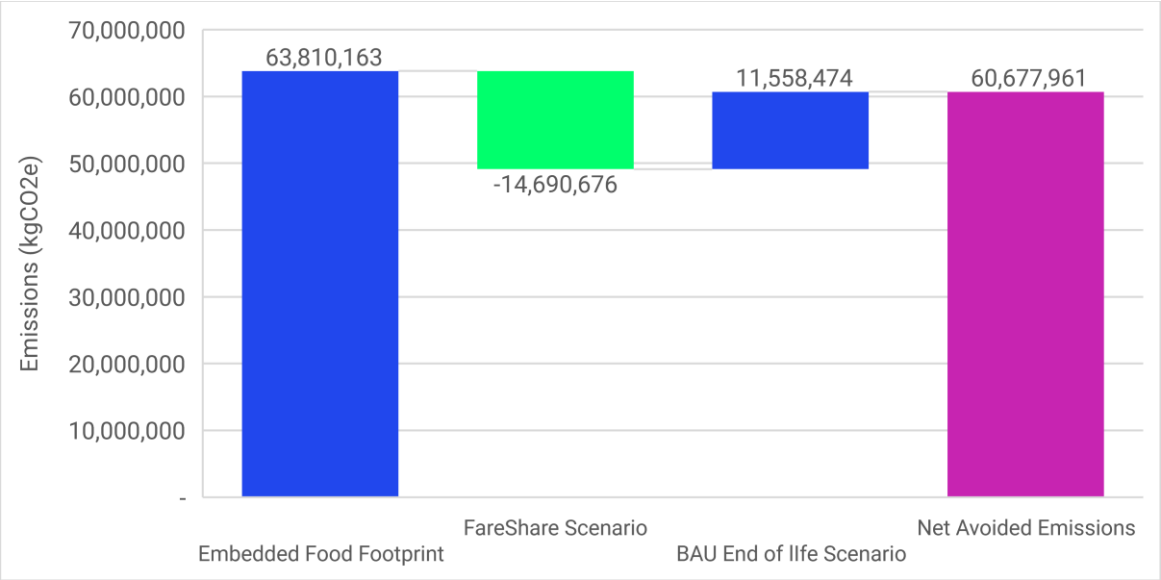


Figure 16. Total Emissions by scenario and total avoided emissions (tCO2e)

Of the business-as-usual scenario, 97% of emissions were derived from direct end-of-life destination assumptions. It was assumed 27% of food waste was sent to landfill, which is a large source of carbon emission due to methane production as it degrades.

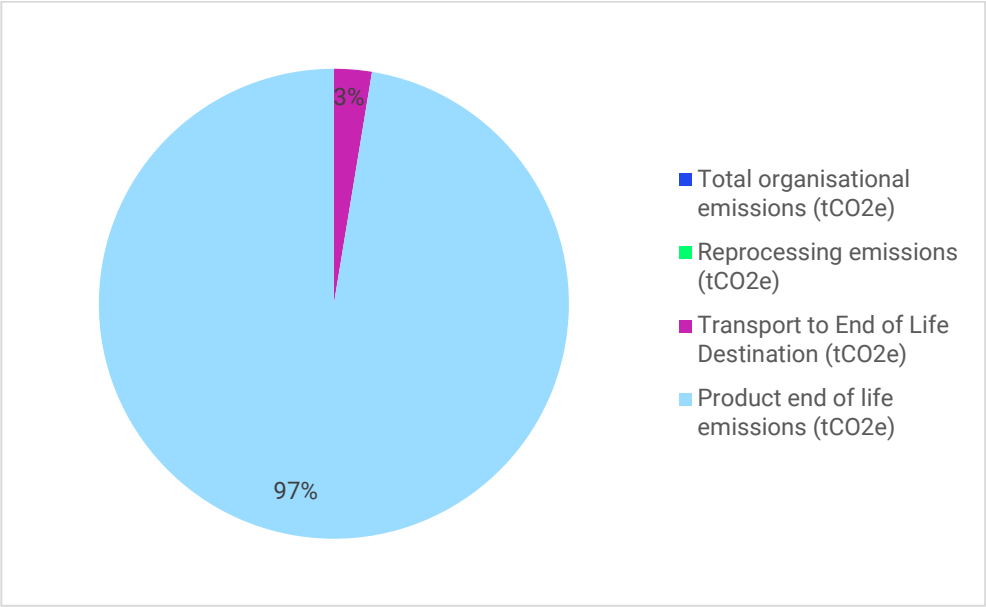


Figure 17. Emissions by source- Business as usual (tCO2e)

The largest emission source within the FareShare scenario was 95% (13,976 tCO2e) from the organisational emissions of the FareShare partner network, further breakdown and commentary is available in the section 5.1. There were no emissions from product end of life, based on the evidence and assumptions provided by FareShare that zero food loss and waste within their operational control was sent to landfill.

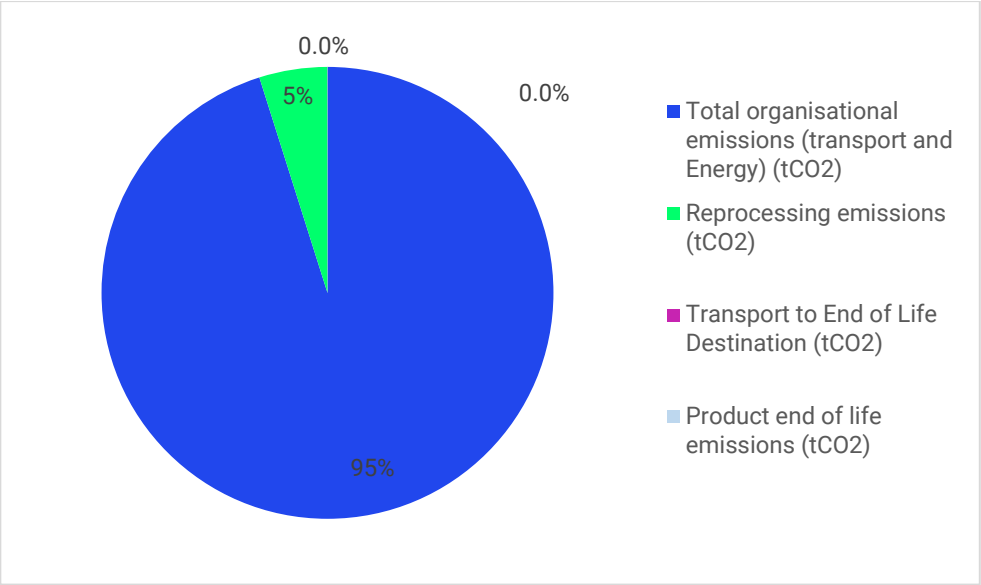


Figure 18. Emission by source- Fareshare Scenario (tCO2e)

6.4. FareShare Net GHG emission Impact 2022/2023

The three exercises that have been conducted by Carbon Trust effectively show the emissions associated with FareShare's operations and the avoided emissions of the food waste both embedded and end of life. The net GHG emission impact of FareShare's operations subtracts their own footprint which includes their utility usage and transportation from the emissions associated with avoiding wasting the food they redistribute.

The project found that FareShare had prevented approximately 31,510 tonnes of surplus food going to waste and prevented the waste of 63,810 tCO2e. Considering FareShare's operational and other food processing footprint as well as assuming that one tonne of redistributed food avoids the purchase of one tonne of equivalent food, FareShare can enable the avoidance of up to **~60,678 tCO2e**.

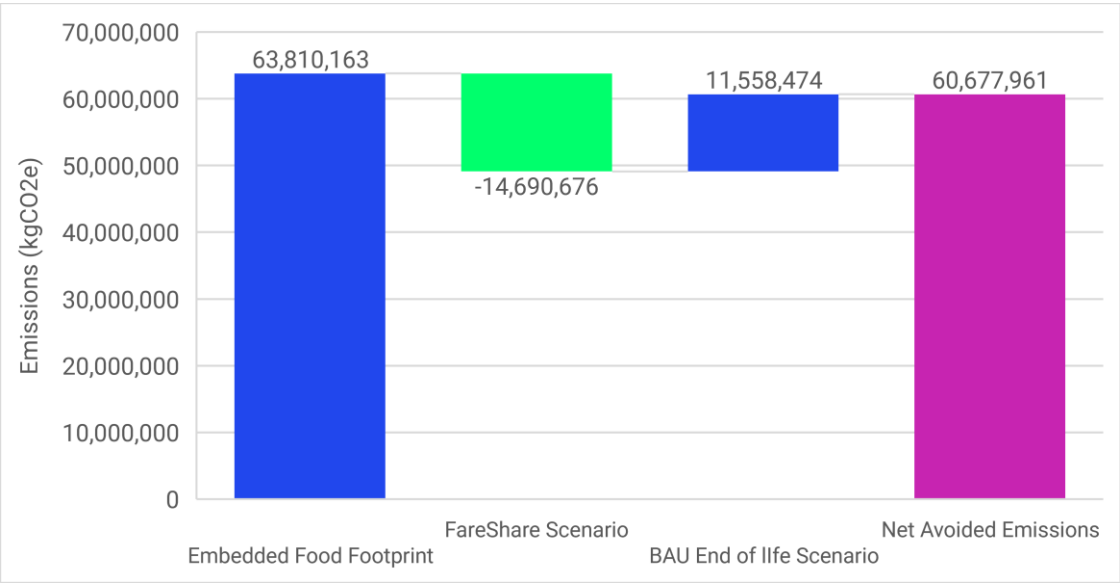


Figure 19: The overall environmental impact of FareShare's operations

Figure 19 shows avoided emissions tCO2/t per surplus food by network partner. There is variation between network partner caused in part by different organisational footprints. However, the biggest impact on this ratio, is the variation in food categories handled by each network partner and the significantly different embedded emissions in those food categories. This is outlined when only embedded emission in food redistributed (tCO2e/t) is compared against surplus food redistributed (T) by network partner see figure 20.

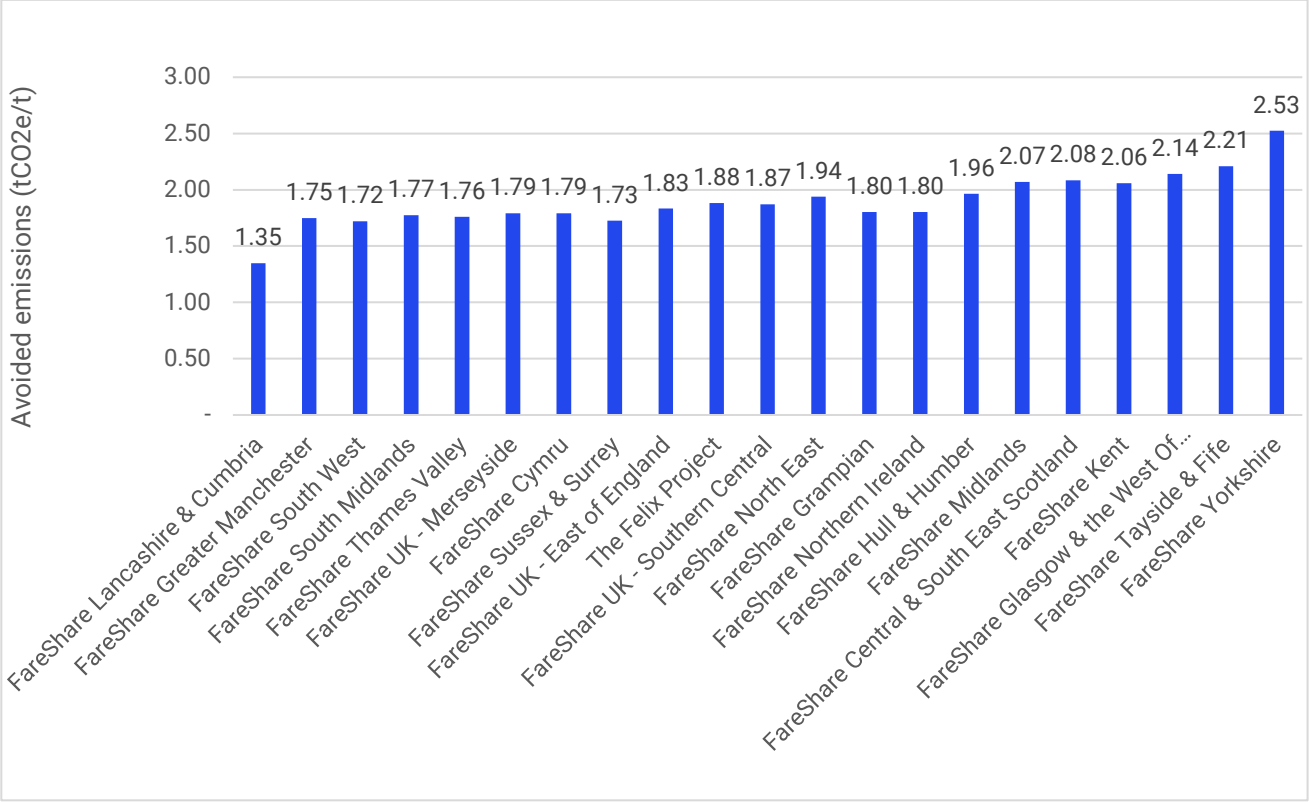


Figure 20. Avoided Emissions tCO2e/t surplus food by network partner

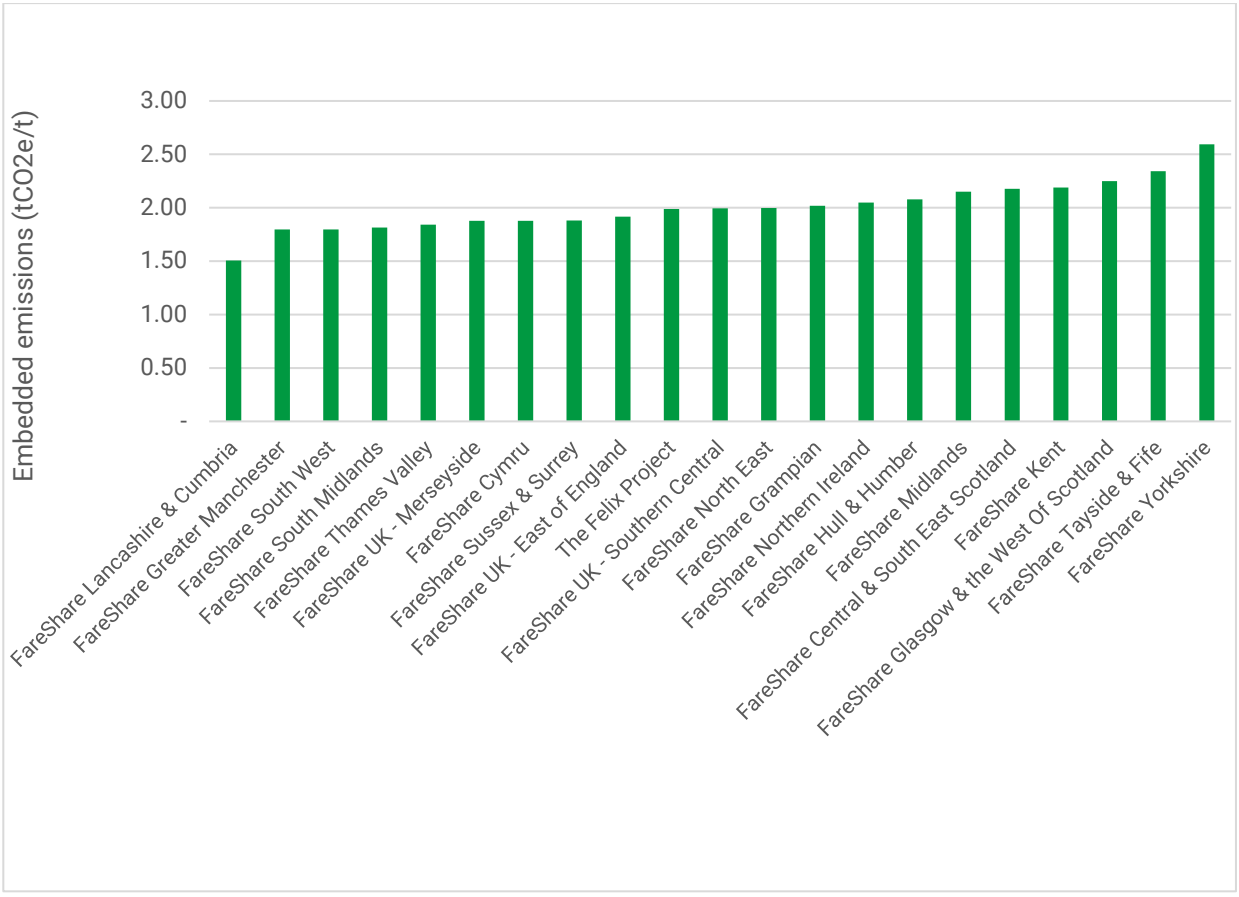


Figure 21. Embedded emissions in food redistributed in tCO2e/t-food-redistributed.

6.4.1. Comparison to end of life destinations

Using the BEIS 2022 database for waste emission factors as well as the Carbon Trust's internal landfill calculator, the emission factor for FareShare can be compared to other end of life destinations. This shows that FareShare is a much less emissions intensive process than landfill, however much larger than anaerobic digestion, incineration and composting. This is most likely due to the cut off allocation used for the calculation of these emission factors. As the food becomes another product, the operational emissions associated with these end of life fates are allocated to the next products lifecycle, rather than the incoming food wate.

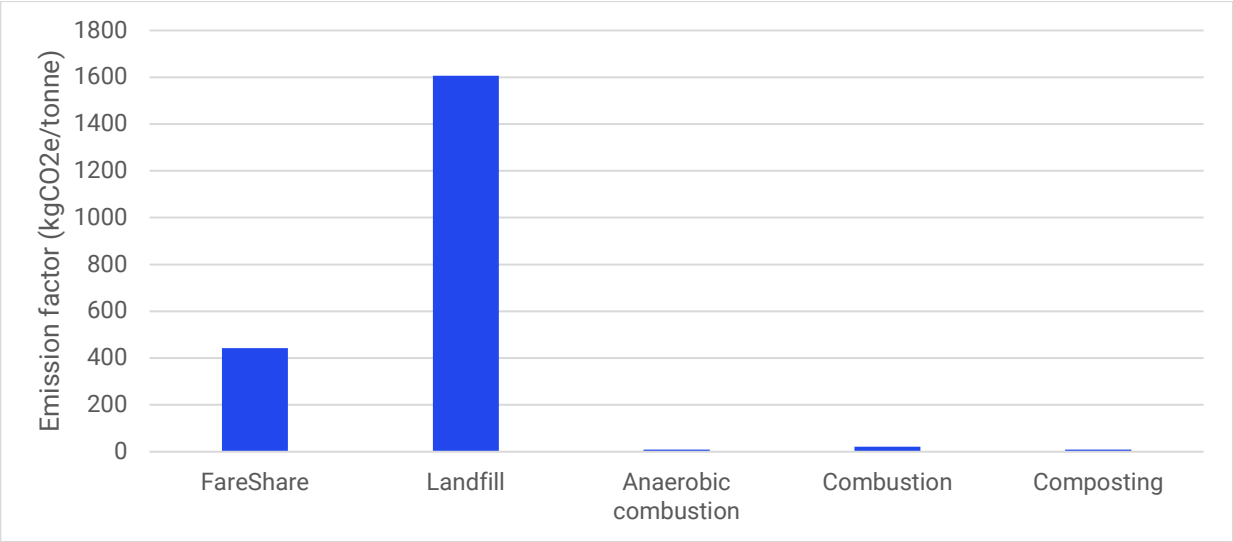


Figure 22: Summary comparison of end-of-life destinations

7. Summary & Recommendations

This report has set out the methodology for assessing FareShare's impact both of their own operation emissions and avoided emissions and embedded water due to the re-distribution of food waste. It also provides the net environmental impact of avoiding food waste and an analysis of those results. It details the assumptions applied and decisions made by the Carbon Trust in the development of the three models.

This exercise has clearly shown the positive environmental affect FareShare has alongside it's clear social impact. Not wasting the emissions embedded within the food from going to waste and avoiding emissions that would have arisen had this food been thrown, FareShare has counterbalanced its own operational emissions to have a net positive impact on the environment.

7.1. Summary of Results

As stated in Section 5. FareShare does not support the avoided emission calculation, due to the assumption that 1 tonne of redistributed food avoids the purchase of 1 tonne of equivalent food.

Table 10 Summary of results per Network Partner

Network Partner	Operational Footprint	Total emissions prevented from waste	Total water prevented from waste	Total avoided emissions
	(tCO2e)	(tCO2e)	(million-litre)	(tCO2e)
	(tCO2e/t-redistributed-surplus-food)	(tCO2e/t-redistributed-surplus-food)	(million-litre/t-redistributed-surplus-food)	(tCO2e/t-redistributed-surplus-food)

FareShare Cymru	348	1,501	2,100	1,312
	0.66	1.88	2.63	1.64
FareShare Northern Ireland	259	974	1,513	785
	0.77	2.05	3.18	1.65
FareShare Yorkshire	676	3,912	4,925	3,593
	0.67	2.59	3.26	2.38
FareShare UK (overall)	1,066	4,415	6,345	3,878
	0.67	1.93	2.78	1.70
FareShare UK – East of England	260	950	1,514	908
	0.52	1.92	3.06	1.83
FareShare UK – Merseyside	415	1,666	2,304	1,591
	0.47	1.88	2.60	1.79
FareShare UK – Southern Central	431	1,796	2,527	1,683
	0.48	2.00	2.81	1.87
FareShare UK – Evelyn Court*	0.392	n/a	n/a	n/a
	n/a	n/a	n/a	n/a
FareShare UK – Millbank Tower*	10	n/a	n/a	n/a
	n/a	n/a	n/a	n/a
FareShare Glasgow & the West of Scotland	531	2,781	3,676	2,448
	0.65	2.25	2.97	1.98
FareShare Lancashire & Cumbria	457	1,273	2,158	1,016
	0.76	1.51	2.55	1.20

FareShare Hull & Humber	348	1,615	2,407	1,408
	0.67	2.08	3.10	1.81
The Felix Project	4,008	18,848	22,552	19,763
	0.64	1.99	2.38	2.08
FareShare North East	451	2,112	2,974	1,890
	0.65	2.00	2.82	1.79
FareShare South West	608	2,515	3,531	2,196
	0.66	1.80	2.52	1.57
FareShare Sussex & Surrey	402	1,519	2,035	1,311
	0.67	1.88	2.52	1.62
FareShare Tayside & Fife	250	1,244	1,578	1,116
	0.64	2.34	2.97	2.10
FareShare Kent	348	1,680	2,520	1,463
	0.68	2.19	3.28	1.91
FareShare Greater Manchester	837	3,115	4,424	2,799
	0.70	1.80	2.55	1.62
FareShare Grampian	349	1,168	1,704	953
	0.81	2.02	2.94	1.65
FareShare South Midlands	217	870	1,156	784
	0.67	1.82	2.41	1.63
FareShare Thames Valley	386	1,589	2,265	1,393
	0.67	1.85	2.63	1.62

FareShare Midlands	2,144	11,046	13,753	9,873
	0.64	2.15	2.68	1.92
FareShare Central & South East Scotland	326	1,644	2,257	1,457
	0.65	2.18	2.99	1.93
Total	14,012	63,821	83,872	59,441
	0.44	2.03	2.66	1.89

*: This site is an office that does not transport food.

7.2. Recommendations

The following sections list out how FareShare can use the information the Carbon Trust has provided by both reducing their own emissions and improve the overall data quality of the results. The emission reductions are focused on their organisational footprint as this will have an impact not only on their own emissions but on the emissions that also avoid from keeping the food waste out of landfill.

7.2.1. Emission Reduction Recommendations

The majority of FareShare's operational footprint comes from third party logistics providers, unfortunately this is an area FareShare has little control over. However, by using logistics providers that have a greater electric fleet or a fleet that uses biofuels this can reduce this portion of the footprint. Efficiency in transportation could be improved, ensuring all transport is as fully loaded as possible, dividing the impact of the transport vehicle over the greatest volume of food. Can FareShare improve the level of backhauling in its redistribution network, by reducing the number of empty trips taken. Another option could be to bring more transport distribution in house, this brings greater control on transportation used, possibly enabling a move toward renewable transport, however, does require investment. Another method to reduce transport emissions is to reduce the distance travelled by the incoming food by focusing on local sourcing of food.

An emission reduction within the control of FareShare's site would be to try and reduce scope 2 emissions through moving to green tariffs or investing in on-site renewable electricity to reduce the emissions that come from electricity generation. Furthermore, linking to the Scope 2 emissions we would recommend changing consumption behaviours by moving to low energy lightbulbs, having light sensors so lights are not left on, turn off appliances when not being used, use natural light where possible.

Further emissions reduction can come from increased energy efficiency measures and improved maintenance of refrigeration systems. As FareShare's stores large amounts of food this could help to reduce emissions.

7.2.2. Activity Data Quality Recommendations

To approve the accuracy of your organisational footprint which will allow for more specific emission reduction recommendations. This could be achieved by increasing the quality of the activity data. We would recommend doing this by:

Firstly, one of the largest hotspots in your emissions is your scope 3 outsourced distribution. 84% of this data is estimated using a proxy method. Therefore, we would recommend trying to provide the weight of product transported (tonnes/kg), the distance transport (km). This would allow for a more accurate distance approach to be used. If the exact distances for each journey cannot be provided, then an average distance travelled across a month which could be extrapolated across the year or distance per kg transported, would help increase the data quality. Also, another data quality improvement would be to provide the vehicle type and type of laden, so the most appropriate emission factor could be applied. This would allow increased traceability of transport routes, if these could be provided per Network partner this would lead to more accurate allocation of emissions.

Additionally, to improve the activity data quality further, we would recommend improving the information on refrigerants for each Network Partners. The Network Partner sites should have F-gas Logs on the number of refrigerants associated with their sites. If these documents can highlight the type of refrigerant and the leakage rate this would allow us to apply the most accurate emission factor for the emissions produced. This would reduce the reliance on secondary data methodology.

Furthermore, to increase the accuracy of comparison between Network Partners for Scope 1 and 2 emissions, a recommendation would be to provide usage data over spend data. Usage data provides a more accurate representation of the emissions produced at a particular site. Usage data for 12 months would be the most ideal, followed by usage data for as many months as possible as this can be extrapolated to cover the 12-month period. If no usage data is available then utility bills of exact spending, as this would require a different less accurate methodology to be used. To implement this suggestion, a recommendation would be to a more centralised system for uploading and storing the document and meter readings from all Network partners throughout the year, so the documents are stored when they get sent to the Network partner. This would make the data collection period easier and more automated.

Ensuring the food data collection is correct as there were some discrepancies between the values provided for Food in, out and wastage. A point for making the data collection process more automated is to coordinate the internal system used to automatically match emission factors to food based on the Fareshare food category chosen.

carbontrust.com

+44 (0) 20 7170 7000

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