# Carbon Footprint Appraisal
# for
# Associated Asphalt Contracting Ltd

Assessment Period:
1st January 2023 – 31st December 2023

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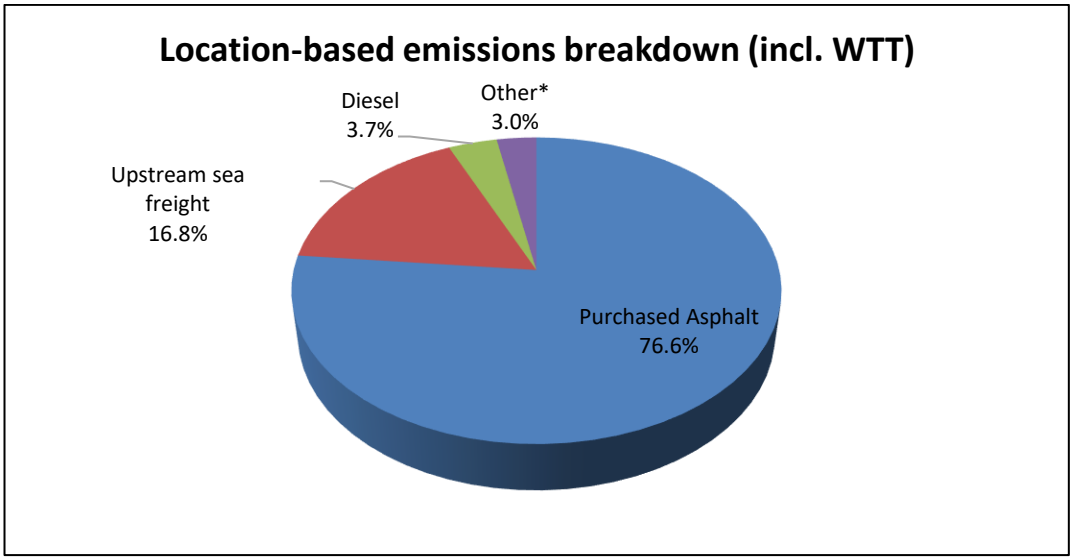
# Executive Summary

**Current Performance**

- Associated Asphalt's total Location-based emissions are 12,356.41 $tCO_2e$
- source is purchased asphalt, accounting for 76.56% of Associated Asphalt's carbon footprint.
- The estimated location-based error margin is a significant aspect (+/- 624.50 $tCO_2e$) and should be offset and be a key focus in future years.

**Recommendations**

- Purchase Asphalt with a lower binder content to reduce emissions associated with this. Furthermore, explore the use of recycled asphalt.
- Investigate adopting an alternative fuel source such as HVO or biodiesel to power vehicles (HGV's) with the largest emissions.
- Optimise your order and diary management to allow sufficient lead time for goods to be transported by via sea freight in one shipment.
- Continue transitioning to electric vehicles (EV)
- Switch to a renewable energy tariff to reduce the emissions associated with electricity use.
- Investigate opportunities to reduce site energy consumption across all sites through implementing regular energy monitoring and conducting an energy audit.
- Carry out a target setting and supply chain screening to facilitate your reduction strategy and increase the scope of your assessment.
- Offset your assessed emissions to become carbon neutral.




*Other= Scopes 1 And 2 WTT, Petrol, Upstream Lorry Freight, Waste, LPG, Electricity (Location-based), Natural Gas, and Transmission & Distribution (Location-based).

| Year/Element | 2023 |
|---|---|
| Total number of employees | 64 |
| Turnover in £ million | 50 |
| **Tonnes of $CO_2e$** | **12,356.41** |
| **Tonnes of $CO_2e$ per employee** | **193.07** |
| **Tonnes of $CO_2e$ per £ million turnover** | **247.13** |

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# Quality Control

| | |
|---|---|
| **Report issue number:** | 1.0 |
| **Date:** | 03 May 2024 |
| **Calculations completed by:** | Finlay Dyche-Brookes |
| **Calculations reviewed by:** | Myles Howard |
| **Report produced by:** | Finlay Dyche-Brookes |
| **Report reviewed by:** | Myles Howard |
| **Director approval:** | Dr. Wendy Buckley |

# 1. Introduction

## 1.1. Company Overview

Associated Asphalt is a civil engineering enterprise which offers comprehensive and multi-disciplined solutions to infrastructures projects within the highways, airfield, and construction sectors.

Associated Asphalt Contracting Ltd work with Government organisations such as Highways England and Crown Commercial Services and the Ministry of Defence on high-profile projects. The company was formed in 2014. Their employees are based in across four sites, all located within the UK, including the company's HQs in Dartford.

- 64 employees
- 4 offices/warehouses

## 1.2. Data supplied for the Carbon Footprint Appraisal

A summary of the data supplied by Associated Asphalt for the appraisal can be provided on request.

## 1.3. Methodology for the Carbon Footprint Appraisal

The methodology document can be downloaded using this link,
https://www.carbonfootprint.com/docs/carbon_footprint_appraisal_-_methodology_document.pdf

## 1.4. Abbreviations

| | |
|---|---|
| $CO_2e$ | Carbon Dioxide Equivalent |
| Defra | Department for Environment, Food and Rural Affairs |
| EV | Electric Vehicle |
| GHG | Greenhouse Gas |
| ISO | International Standards Organisation |
| IWA | International Workshop Agreement |
| km | Kilometres |
| kWh | Kilowatt Hours |
| T&D | Transmission & Distribution |
| WTT | Well-to-Tank |

# 2. Calculation Scope and Accuracy

## 2.1. Scope of this work

Carbon Footprint has assessed the GHG emissions from 1st January 2023 to 31st December 2023 resulting from the energy consumption at Associated Asphalt's facilities and its business transport activities.

Associated Asphalt's baseline year data and emissions can be found in the 2021 report.

## 2.2. Organisational & reporting boundaries

Figure 1 shows the full boundaries of the *Greenhouse Gas Protocol Corporate and Value Chain Standards*. The organisation has accounted for all quantified GHG emissions and/or removals from facilities over which it has financial control. This assessment covers the reporting boundaries shown in Table 1, in line with the Greenhouse Gas Protocol Accounting and Reporting Corporate Standard.

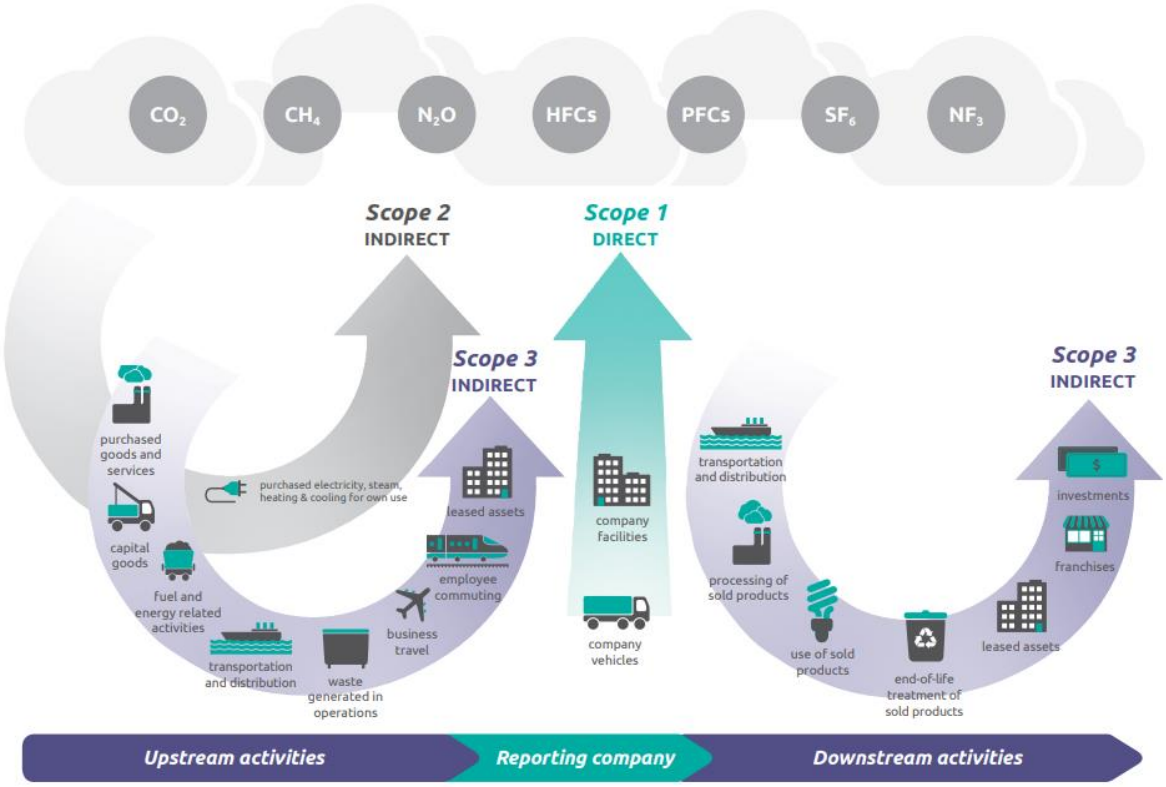



***Figure 1: Overview of emissions scopes (GHG Protocol - Scope 3 Calculation Guidance v1.0 - 2013)***

***Table 1: Associated Asphalt's GHG Assessment boundary based on the Greenhouse Gas Protocol Accounting and Reporting Corporate Standard***

***(All green rows have been included in this assessment; all grey rows are not applicable; orange rows have been excluded)***

| Scope | Activity | Calculation Type | Completion Status | Justification |
|---|---|---|---|---|
| 1 | Electricity, heat, or steam generated on-site | | Not relevant | |
| 1 | On-site fuel use | Activity Data | Complete | |
| 1 | Company owned vehicles | Activity Data | Complete | |
| 1 | Fugitive emissions (incl. Refrigerant gases and AC) | | Complete | No top ups reported |
| 2 | On-site Consumption of purchased electricity, heat steam and cooling | Activity Data | Complete | |
| 3 | 1. Purchased goods and services | Activity Data | Partial | Embodied emissions from purchased asphalt have been considered |
| 3 | 2. Capital goods | | Excluded | Not required for the GHG Protocol Corporate Standard |
| 3 | 3. Fuel- and energy related activities (not included in Scope 1 or Scope 2) | Activity Data | Complete | |
| 3 | 4. Upstream transportation and distribution | Activity Data | Complete | |
| 3 | 5. Waste generated in operation | Activity Data | Complete | Data from previous assessment has been used |
| 3 | 6. Business travel (not included in Scope 1 or Scope 2) | | Excluded | Not required for the GHG Protocol Corporate Standard |
| 3 | 7. Employee commuting | | Excluded | Not required for the GHG Protocol Corporate Standard |
| 3 | 8. Upstream leased assets | | Excluded | Relevance unknown due to lack of resources - intending to determine |
| 3 | 9. Downstream transportation and distribution | | Not relevant | |
| 3 | 10. Processing of sold products | | Excluded | Not required for the GHG Protocol Corporate Standard |
| 3 | 11. Use of sold products | | Not relevant | |
| 3 | 12. End-of-life treatment of sold products | | Excluded | Not required for the GHG Protocol Corporate Standard |
| 3 | 13.Downstream leased assets | | Not relevant | |
| 3 | 14. Franchises | | Not relevant | |
| 3 | 15. Investments | | Not relevant | |

## 2.3. Calculation uncertainty assessment & materiality

The result of a carbon footprint calculation varies in accuracy depending on the data set provided. The more accurate the data supplied, the more accurate the final result. Materiality is determined by the percentage contribution of each element to the overall footprint.

Based on the accuracy of the data provided (Table 2), a simple uncertainty analysis has been used to estimate the potential error margin for the appraisal results.

***Table 2: Assessment accuracy, materiality, and simple error analysis***

| Emission Source | Data source / comments | Materiality | Uncertainty | Total Error Margin ($tCO_2e$) |
|---|---|---|---|---|
| Purchased Asphalt | The total quantity of purchased asphalt in tonnes was provided by Associated Asphalt. A sample invoice was given, alongside the quantity of asphalt used for the Heathrow and Falkland projects. | Very High (>40%) | 5% | 473.00 |
| Upstream sea freight | The total quantity of asphalt in tonnes for each journey was given, alongside the vessel type, departure and destination ports, and the total distance travelled in nautical miles. | Medium (5-20%) | 5% | 103.86 |
| Waste | Information on waste was based on the 2021 assessment weights (tonnes) and waste streams, as no specific waste data was provided. | Very Low (<1%) | 50% | 23.54 |
| Electricity (Location-based) | The Electricity consumption for each site was calculated using factors from the chartered institute of building services engineers. Two factors were applied, dependant on whether the site had air conditioning installed. | Very Low (<1%) | 50% | 8.31 |
| Upstream lorry freight | The total weight of asphalt used for each project (Heathrow and the Falkland Islands) in tonnes was divided by the usual load of each lorry (18 tonnes) to estimate the total number of trips required. This was then applied to each project, with an estimated 945 trips for the Heathrow project and 117 for the Southampton port of Marchwood bound for the Falkland Islands. The average of all HGV factors was applied. | Very Low (<1%) | 10% | 6.05 |

| Emission Source | Data source / comments | Materiality | Uncertainty | Total Error Margin ($tCO_2e$) |
|---|---|---|---|---|
| Diesel | The total volume of diesel purchased through fuel cards was provided in litres. This was evidenced with fuel card downloads. | Low (1-5%) | 1% | 5.62 |
| Natural Gas | It was assumed that natural gas was used at sites which did not employ electric heaters. From the site descriptions provided by Associated Asphalt, only the Bury St Edmonds site matched this criterion. | Very Low (<1%) | 50% | 2.85 |
| Petrol | The total volume of petrol purchased through fuel cards was provided in litres. This was evidenced with fuel card downloads. | Very Low (<1%) | 1% | 0.83 |
| LPG | The total volume of LPG purchased through fuel cards was provided in litres. This was evidenced with fuel card downloads. | Very Low (<1%) | 1% | 0.44 |
| **Total** | | | **+/-5.1%** | **+/- 624.50** |

# 3. Carbon Footprint Results

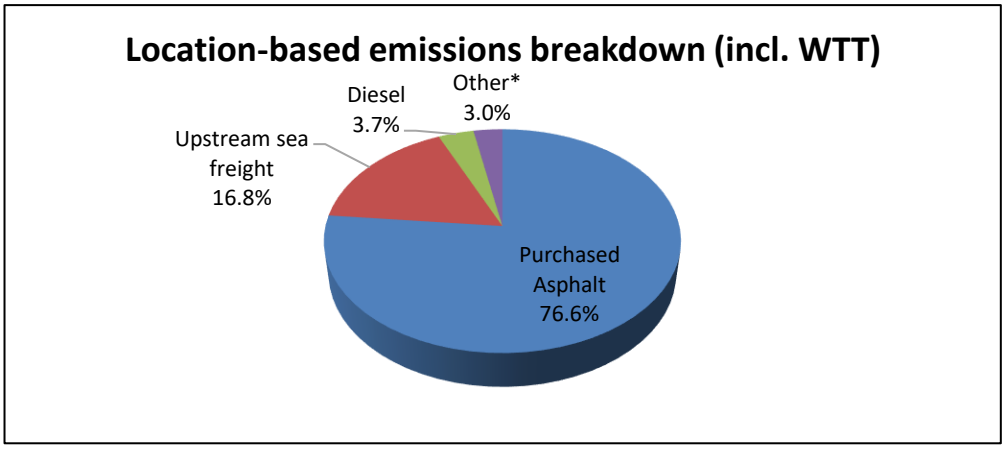
## 3.1. Summary of results

**The total location-based carbon footprint for Associated Asphalt for the period ending 31st December 2023 is 12,356.41 tonnes $CO_2e$.**

***Table 3: Results of Associated Asphalt's carbon footprint assessment by scope and GHG Protocol emission categories***

| Scope | Emission Source | Total ($tCO_2e$) |
|---|---|---|
| 1 | Natural Gas | 4.88 |
| | Diesel | 451.86 |
| | Petrol | 65.38 |
| | LPG | 39.36 |
| **Scope 1 Total** | | **561.49** |
| 2 | Electricity | 12.53 |
| **Scope 2 Total** | | **12.53** |
| 3.1 | Purchased Asphalt | 9,460.00 |
| 3.3 | Scopes 1 and 2 WTT | 136.29 |
| | Transmission & Distribution | 1.32 |
| 3.4 | Upstream sea freight | 2,077.19 |
| | Upstream lorry freight | 60.51 |
| 3.5 | Waste | 47.08 |
| **Scope 3 Total** | | **11,782.39** |
| **All** | **Tonnes of $CO_2e$** | **12,356.41** |
| | **Tonnes of $CO_2e$ per employee** | **193.07** |
| | **Tonnes of $CO_2e$ per £ million turnover** | **247.13** |

*A full breakdown of emissions by source has been provided in Annex A.*




*Other = Scopes 1 And 2 WTT, Petrol, Upstream Lorry Freight, Waste, LPG, Electricity (Location-based), Natural Gas, Transmission & Distribution (Location-based).

***Figure 2: Percentage contribution of each element of Associated Asphalt's location-based carbon footprint***

## 3.2. Emissions from Purchased Asphalt

The embodied emissions of the purchased asphalt were calculated based on the binder content of the asphalt, which was reported by Associated Asphalt to be 8%. The factor was obtained from the Inventory of Caron and Energy (ICE) released by the Building Services Research and Information Association (BSRIA). The embodied carbon of one kilogram of asphalt with an 8% binder content was sourced from the 2010 release of the above document, due to the fact that an emission factor for 8% binder asphalt is not reported in the 2019 release. Product LCAs should be requested from your supplier to ascertain the true carbon content of your purchased asphalt.

From the 110,000 tonnes of asphalt purchased, the total embodied emissions were calculated to be 9,460 $tCO_2e$. This is 76.6% of the total emissions, and 80.3% of the total Scope 3 emissions.

## 3.3. Emissions from Freight

Emissions from the movement of asphalt by road were calculated based on the average haulage weight, set by Associated Asphalt at 18 tonnes, and the estimated distance from source to destination location. For the Heathrow project, a total of 17,000 tonnes of asphalt was required, amounting to 945 journeys of 18 tonnes. The distance was provided by Associated Asphalt and was 10 miles. For the Falkland Island project, a total of 2,107 tonnes of asphalt was shipped from Marchwood equating to 117 trips. It was assumed that this asphalt came from the same location, Heathrow Colnbrook, for a total distance of 67.5 miles. Further to these projects, fuel is used for other haulage and transport.

When assessing the emissions from the movement of goods via sea, the vessel type and total weight shipped were used. A total of two journeys were undertaken by Associated Asphalt, moving a total of 400 and 17,704 tonnes respectively.

***Table 4: $CO_2e$ emissions associated with freight (excl. WTT)***

| GHG Protocol Emission Category | Emission Source | Well-to-Tank ($tCO_2e$) | Tank-to-Wheel ($tCO_2e$) | Well-to-Wheel (Total) ($tCO_2e$) |
|---|---|---|---|---|
| 4. Upstream transportation and distribution | Upstream sea freight | 383.94 | 1,693.24 | 2,077.19 |
| | Upstream lorry freight | 11.79 | 48.72 | 60.51 |
| **Total** | | **395.73** | **1,741.97** | **2,137.70** |

- Well-to-Tank (WTT): refers to the upstream emissions of getting the fuel/energy to the point of use (extraction, refining and distribution to a fuel station)
- Tank-to-Wheel (TTW): emissions generated during operation (while fuel/energy is being used)
- Well-to-Wheel: full lifecycle combined emissions from source to consumption (WTT and TTW combined)

## 3.4. Emissions from Fuel Consumption

Emissions from vehicle fuel consumption were calculated from the total volume of fuel purchased in litres for all three fuel sources. This fuel is used by Associated Asphalt's company operated vehicles. Emissions from fuel consumption account for 4.5% of the overall footprint, with diesel being the largest contributor of vehicle fuel emissions at 81.2%.

***Table 5: $CO_2e$ emissions associated with business travel***

| GHG Protocol Emission Category | Emission Source | Well-to-Tank ($tCO_2e$) | Tank-to-Wheel ($tCO_2e$) | Well-to-Wheel (Total) ($tCO_2e$) |
|---|---|---|---|---|
| Company owned vehicles | Petrol | 18.11 | 65.38 | 83.49 |
| | LPG | 4.69 | 39.36 | 44.05 |
| | Diesel | 109.91 | 451.86 | 561.76 |
| **Total** | | **132.70** | **556.61** | **689.31** |

## 3.5. Emissions from Well-to-Tank

Well-to-tank emissions relate to the upstream emissions of fuel and energy; accounting for extraction, processing, and transport of fuels/energy. **Associated Asphalt can reduce these emissions by reducing fuel and energy usage.**

***Table 6: Well-to-Tank $CO_2e$ Emissions breakdown***

| Emission Source | Location-based ($tCO_2e$) |
|---|---|
| Upstream sea freight | 383.94 |
| Diesel | 109.91 |
| Petrol | 18.11 |
| Upstream lorry freight | 11.79 |
| LPG | 4.69 |
| Electricity | 2.78 |
| Natural Gas | 0.81 |
| Transmission & Distribution | 0.24 |
| **Total** | **532.26** |

# 4. Comparison, Publication, and Benchmarking

## 4.1. Comparison to base year emissions

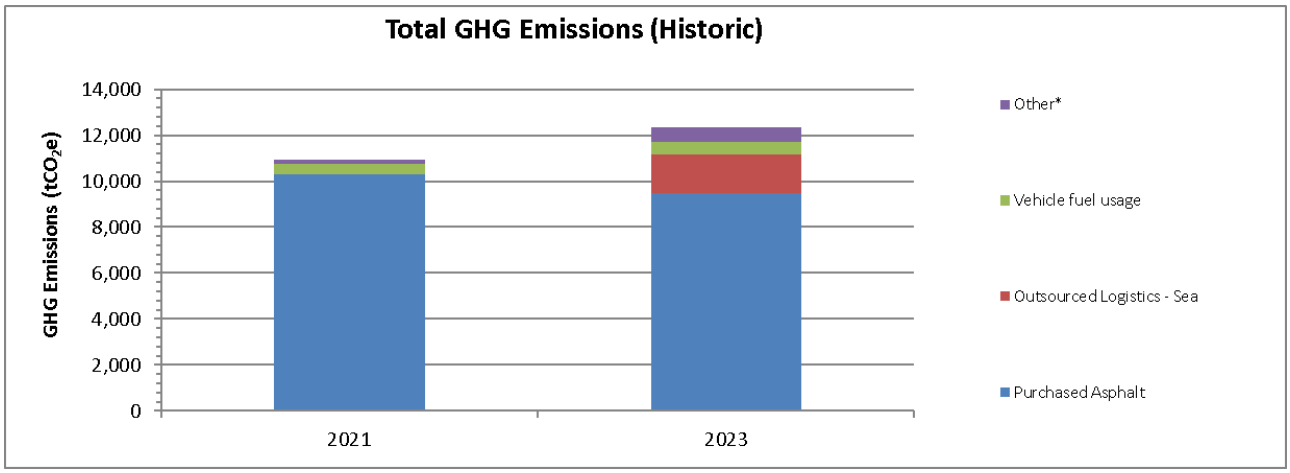
The table below shows historical emissions per activity, as well as the total carbon footprint and carbon intensity metrics (tonnes of $CO_2e$ per employee and tonnes of $CO_2e$ per £M turnover).

***Table 7: Associated Asphalt's carbon footprint comparison and percentage change***

| Element | 2021 | 2023 | Change on baseline year (2021) (%) |
|---|---|---|---|
| Purchased Asphalt | 10,318.97 | 9,460.00 | -8.3%▼ |
| Outsourced Logistics - Sea | - | 1,693.24 | n/a |
| Vehicle fuel usage | 422.29 | 556.61 | 31.8%▲ |
| Well-to-Tank (Location-based) | 122.64 | 532.26 | 334.%▲ |
| Outsourced Logistics - Road | 0.45 | 48.72 | >100.0%▲ |
| Waste | 47.08 | 47.08 | - |
| Site electricity (Location-based) | 12.61 | 13.61 | 8.0%▲ |
| Site gas | 8.95 | 4.88 | -45.4%▼ |
| Hire cars | 1.85 | - | -100.0%▼ |
| Non-Controlled Site diesel | 74.49 | - | -100.0%▼ |
| **Total Tonnes of $CO_2e$ (Location-based)** | **11,009.32** | **12,356.41** | **12.2%▲** |
| **- Tonnes of $CO_2e$ per employee** | **220.19** | **193.07** | **-12.3%▼** |
| **- Tonnes of $CO_2e$ per £ M turnover** | **262.19** | **247.13** | **-5.7%▼** |

* Not assessed

\- Not relevant




*Other = Scopes 1 and 2 WTT, Petrol, Upstream lorry freight, Waste, LPG, Electricity (Location-based), Natural Gas, and Transmission & Distribution (Location-based).

***Figure 3: Detailed emissions comparison for the various aspects of Associated Asphalt's emissions***

Benchmarked against employee numbers and company turnover (adjusted for inflation) the carbon emissions statistics show a decrease in both intensity metrics since 2021.

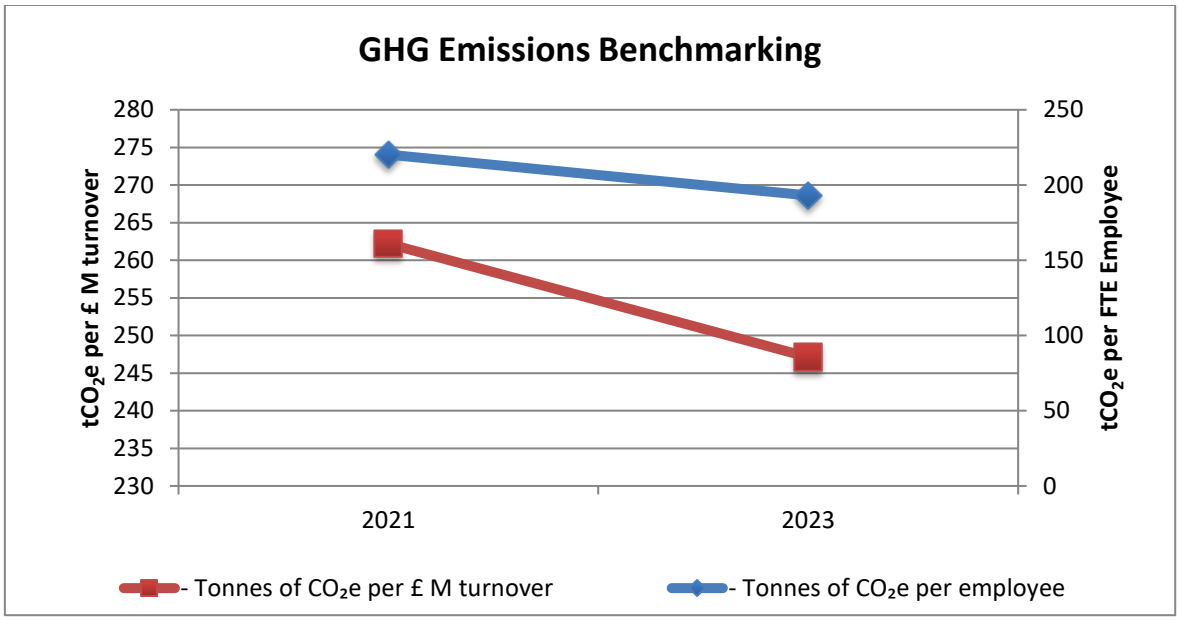



***Figure 4: Carbon footprint of Associated Asphalt for internal benchmarks***

## 4.2. External Publication and Benchmarking of Your Carbon Footprint

We strongly encourage you now to **publish your carbon footprint results on Carbon Database Initiative (CaDI)** – our new global platform.

https://carbondi.com/

**External publication demonstrates your commitment to carbon management and to responsible transparency. Your results will also be endorsed on CaDI as 'Verified' for additional peace of mind for you and viewers of the data.**

Using CaDI, you can also search other organisations that have reported their emissions to benchmark your performance.

As a Carbon Footprint client, your headline carbon footprint results will be automatically uploaded to your CaDI account for your ease – **though, rest assured, they will only be made public upon you choosing to publish them.**

Many companies report Scope 1 & 2 emissions for comparison against others as elements included in Scope 3 can vary greatly. Table 8 summarises the emissions across these Scopes, along with metrics showing emissions per unit turnover and per employee, to help your benchmarking.

***Table 8: Associated Asphalt's benchmarked GHG emissions***

| Year/Element | 2023 |
|---|---|
| Total number of employees | 64 |
| Turnover in £ million | 50 |
| Tonnes of $CO_2e$ | 12,356.41 |
| Tonnes of $CO_2e$ per employee | 193.07 |
| Tonnes of $CO_2e$ per £ million turnover | 247.13 |
| **Scope 1 & 2 Emissions** | |
| Tonnes of $CO_2e$ | 574.02 |
| Tonnes of $CO_2e$ per employee | 8.97 |
| Tonnes of $CO_2e$ per £ million turnover | 11.48 |

# 5. Conclusion

Associated Asphalt, in conjunction with Carbon Footprint Ltd, has assessed its carbon footprint and has achieved a successful assessment of their 2023 carbon emissions associated with the elements outlined in Table 1. Further to this, it has demon sated a reduction against both intensity metrics against the previous year assessment.

By achieving this Associated Asphalt has qualified to use the Carbon Footprint Standard branding. This can be used on all marketing materials, including website and customer tender documents, to demonstrate your carbon management achievements.

# 6. Recommendations

## 6.1. Carbon & sustainability targets

### 6.1.1. Target setting for net zero

Associated Asphalt should set targets based on per employee and/or per £M turnover, which will account for business growth. Many organisations are now setting targets based on typical mid-term and longer terms goals to reach net zero (ISO's International Workshop Agreement on Net Zero Guidance - IWA 42:2022[1]):

- A 50% reduction in emissions per £M turnover/employee by 2030.
- A 90% reduction in emissions per £M turnover/employee by 2045.

All targets set should be reviewed regularly and amended accordingly (i.e. target increased if it is met ahead of schedule). A clear roadmap for individual emissions sources should be in place. This will ensure the strategy for reducing $CO_2e$ emissions and tracking toward a net zero target is appropriate for the business.

A hyperlink to Carbon Footprint Ltd's whitepaper on target setting can be found below:
https://www.carbonfootprint.com/docs/2021_12_cfp_practical_target_setting_-_white_paper_v10.pdf

### 6.1.2. Expand the Scope of the Assessment

We recommend that the scope of the assessment is expanded in future to include the aspects that are identified as excluded in Table 1.

The most material element would likely be, purchased good and services outside of asphalt and employee commuting, due to the nature of your business, so we recommend you focus on capturing data for this ready for next year's appraisal.

### 6.1.3. Improving the accuracy of future carbon footprint assessments

The estimated overall error margin is +/- 5.05% (which represents +/- 624.50 $tCO_2e$ of the total assessed emissions).

To improve the accuracy of future assessments, we recommend the following:

- Provide evidence of freight journeys and weights.
- When asking employees to fill out expense claims, ask for the mode of transport, distance travelled, fuel type and engine size (for vehicles) to also be recorded in addition to the journey cost.

[1] ISO - Net Zero Guidelines

- Ask suppliers for EPDs relating to your purchased products.
- Retain information on building energy consumption to remove the need for estimation based on floor area occupied. This should include electricity and natural gas bills and/or consumption reports.

## 6.2. Reducing emissions

To reduce GHG emissions, we recommend the following:

- Purchase Asphalt with a lower binder content to reduce emissions associated with this. Furthermore, explore the use of recycled asphalt. This will aid in reducing emissions associated with the highest element of your footprint.
- Investigate adopting an alternative fuel source to power vehicles with the largest emissions. Vehicles such as owned HGVs could use HVO or biodiesel, also known as FAME (Fatty Acid Methyl Esters) produced from vegetable oils. These fuel types can be used with no mechanical modification of vehicles and have a net emission saving of approximately 80 - 90% compared to standard petrol or diesel vehicles.
- Work with your supply chain to optimise your order and diary management to allow sufficient lead time for goods to be transported by via sea freight to reduce your reliance on air freight.
- Investigate with freight couriers what their long-term plans are to reduce emissions and increase sustainability. This could be achieved through the electrification of fleet vehicles (e.g. vans) and improving sustainability policies. In the long-term this might involve planning a switch to hydrogen or electric powered lorries.
- Continue transitioning to electric vehicles (EV), to build on the carbon reductions you will already be benefiting from. Where charging points are not already present, install these to increase charging capacity but to also encourage employees to switch to EVs.
- Switch to a renewable energy tariff to reduce emissions associated with electricity use. Many "green" electricity tariffs are now the same price as the traditional brown tariffs. Once you have done this you will be able to report your market-based emissions alongside your location based.
- Investigate opportunities to reduce site energy consumption across your sites. This could be done through conducting an onsite energy audit at your most energy intensive site. Carbon Footprint Ltd can complete site energy audit for you and provide recommendations for saving energy.

## 6.3. Carbon offsetting

**Carbon offsetting is a pragmatic way to compensate for the emissions that you cannot reduce, by funding an equivalent carbon dioxide saving elsewhere.**

The majority of projects focus on the development of renewable energy in developing countries, however there are others which have a greater focus on social benefits as well as environmental benefits. Further detail on the type and specific projects that we currently have in our portfolio can be provided on request or be found at: http://www.carbonfootprint.com/carbonoffsetprojects.html.

# Annex A

A full breakdown of Associated Asphalt's emission sources is given below. This aligns with the GHG Protocol classification methodology and provides each associated emission source:

| Scope | GHG Protocol Emission Category | Emission Source | Total ($tCO_2e$) |
|---|---|---|---|
| 1 | On-site fuel use | Natural Gas | 4.88 |
| | Company owned vehicles | Diesel | 451.86 |
| | | Petrol | 65.38 |
| | | LPG | 39.36 |
| **Scope 1 Total** | | | **561.49** |
| 2 | On-site Consumption of purchased electricity, heat steam and cooling | Electricity | 12.53 |
| **Scope 2 Total** | | | **12.53** |
| 3.1 | 1. Purchased goods and services | Purchased Asphalt | 9,460.00 |
| 3.3 | 3. Fuel- and energy related activities (not included in Scope 1 or Scope 2) | Scopes 1 and 2 WTT | 136.29 |
| | | Transmission & Distribution | 1.32 |
| 3.4 | 4. Upstream transportation and distribution | Upstream sea freight | 2,077.19 |
| | | Upstream lorry freight | 60.51 |
| 3.5 | 5. Waste generated in operation | Waste | 47.08 |
| **Scope 3 Total** | | | **11,782.39** |
| **All** | **Tonnes of $CO_2e$** | | **12,356.41** |
| | **Tonnes of $CO_2e$ per employee** | | **193.07** |
| | **Tonnes of $CO_2e$ per £ million turnover** | | **247.13** |