ARUP

Upstream CO2 Emissions Analysis

Arup Netherlands Group

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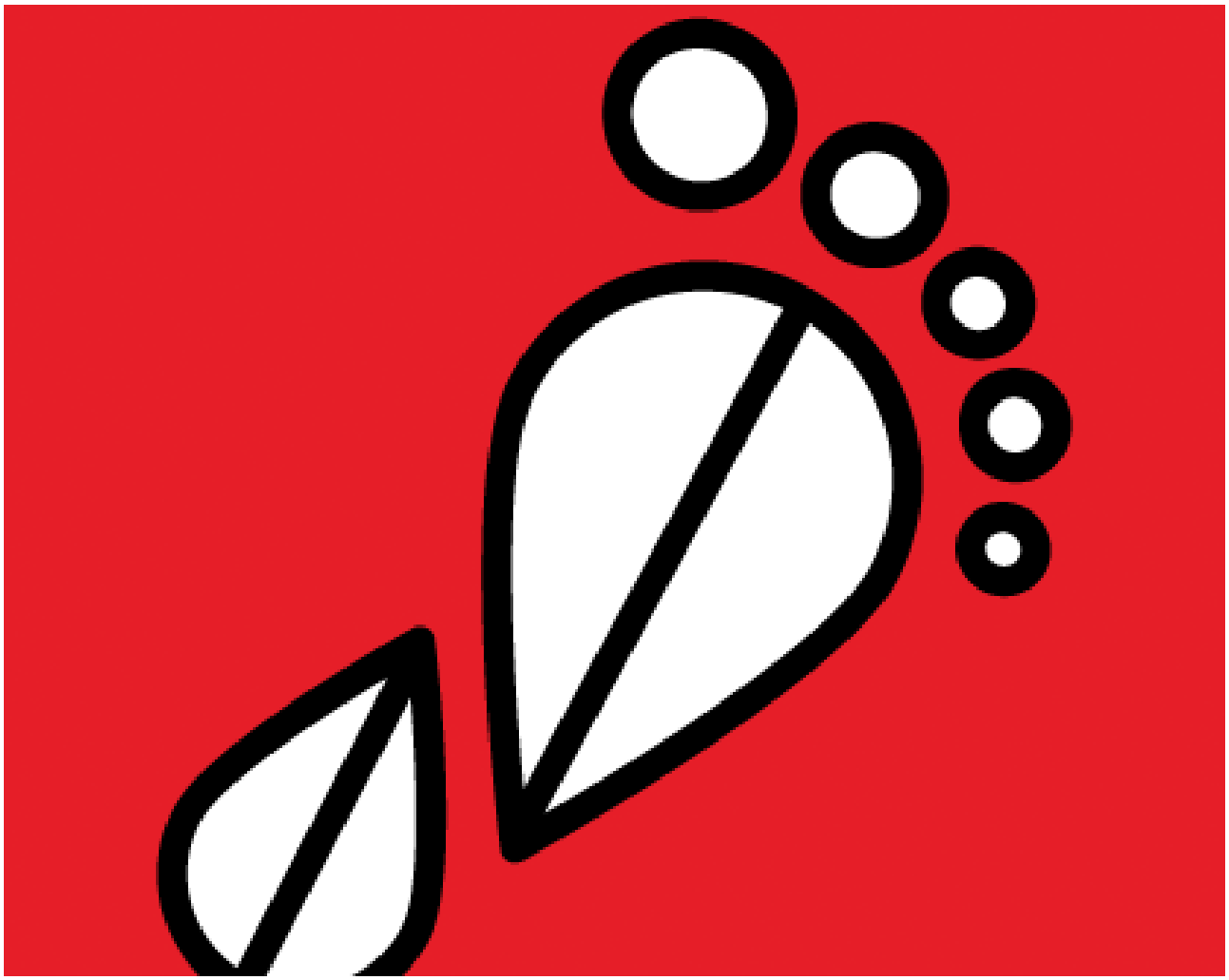

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Job number

Arup B.V.
Beta Building Naritaweg 118
1043 CA
Amsterdam
Netherlands
arup.com

ARUP

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		Name	K. Komarnyckyj	P van Horn	P van Horn
		Signature	K Komarnyckyj		
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
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1. Introduction

Arup has made a commitment to be a net zero organisation by 2030. As part of this goal, the Europe Region has produced "Achieving Net Zero - ER GHG Emission Reduction Plan" dated August 2020 and the Netherlands Group has achieved CO_2-Prestatieladder level 5. The CO2-prestatieladder handbook considers Arup NL to be a small business. Section 6.2.1 therefore has appliable two requirements (5.A.1 and 5.A.2) regarding analysis of supply chain emissions, see Figure 1.

5A	Alle*	De organisatie heeft portefeuille breed inzicht in scope 3.	5.A.1. De organisatie heeft inzicht in de materiële scope 3 emissies van de organisatie en de meest relevante partijen in de keten die daarbij betrokken zijn.	10
	Alle*		5.A.2-1. De organisatie beschikt over een portefeuille-brede, onderbouwde analyse van mogelijkheden van de organisatie om de materiële scope 3 emissies te beïnvloeden.	5
	M/G		5.A.2-2. De organisatie heeft inzicht in mogelijke strategieën om deze materiële emissies te reduceren.	5
	M/G		5.A.3. De organisatie dient van directe (en potentiële) ketenpartners die relevant zijn voor de uitvoering van de scope 3 strategie, over specifieke emissiegegevens te beschikken die afkomstig zijn van deze ketenpartners.	5
		Doelstelling: De organisatie verbreedt en verdiept haar inzicht in scope 3 en in de wijze waarop de organisatie emissies in scope 3 kan reduceren.		

Figure 1: CO2-prestatieladder handbook 6.2.1

This document records the Upstream Supply Chain CO2 emissions analysis for Arup NL where we aim to address requirements 5.A.1 and 5.A.2 from the CO2-prestatieladder handbook.

A comparison has also been made between the Arup NL office data and the emissions presented in the August 2020 Europe Region Net Zero GHG Reduction Plan.

2. Methodology

The following methodology has been used to identify relevant suppliers and calculate the associate CO2 emissions.

Stage 1 – Identification of relevant suppliers within an organisation boundary:

1. A list of suppliers and invoices was provided by the Finance Team for the 2020/21 financial year (1st April 2020 to 31st March 2021), see Appendix A.
2. Suppliers have been categorised as suppliers of goods or services
3. Suppliers of services have been further categorised into those where the service is provided/used within the Arup office (inhouse) or at an external location.
4. Services that are categorised as "inhouse" have been excluded from the supply chain analysis as their CO2 emissions have already been included within the existing Arup Netherlands CO2 emission analysis. Including them here would lead to double counting of these emissions. See Appendix B for a list of removed suppliers. These include agency staff, lease cars, energy providers etc.
5. Four suppliers have been excluded from the analysis because the invoices were negative (i.e. payments/refunds were made to Arup), see Appendix B.
6. CO2-Prestatieladder Handboek 3.1 section 4.1 "Methode 2: de laterale methode" has been used to identify which suppliers fall within the organisational boundary. To do this, the suppliers were first ranked from largest (highest spend) to smallest (lowest spend) as shown in Figure 2. The cumulative

purchase value of suppliers was then calculated and the top 80% of suppliers was identified, see Figure 3. Appendix C contains a list of the ranked suppliers.

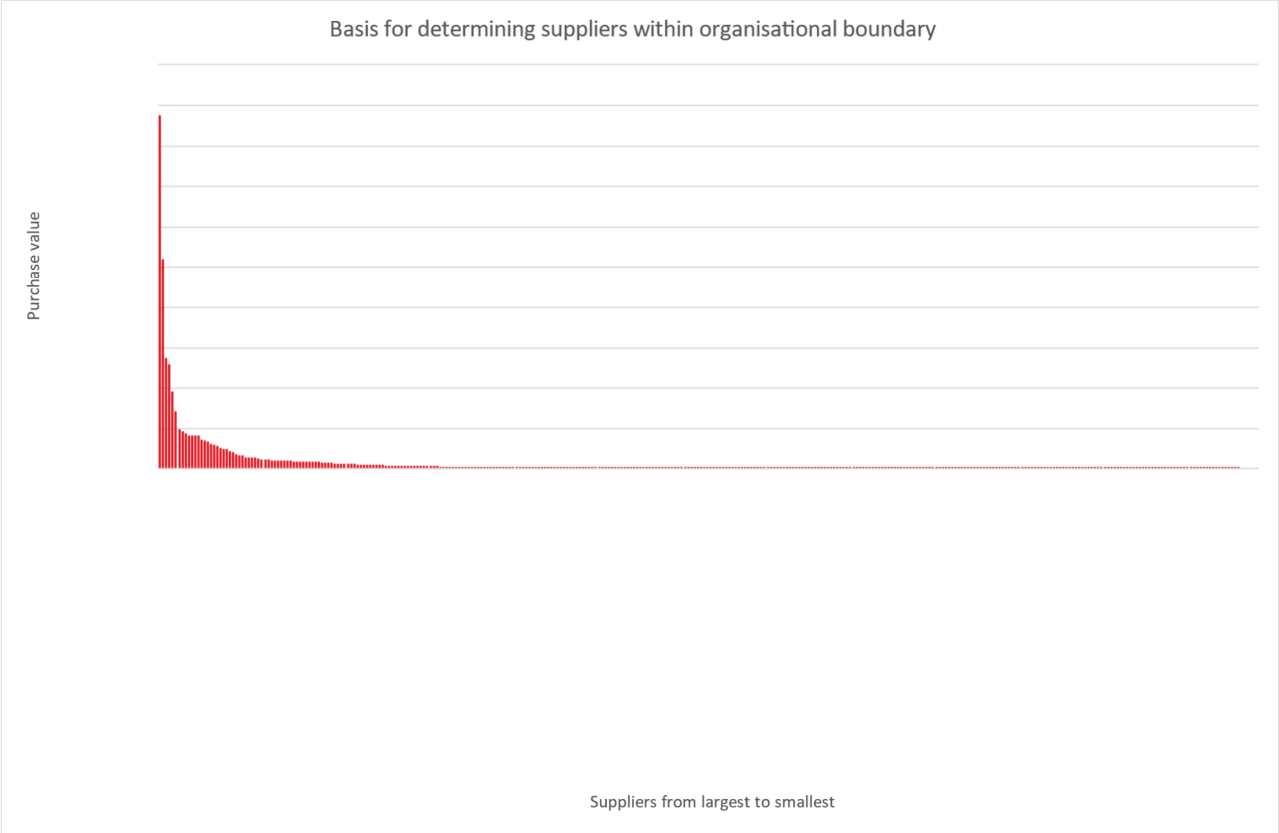

Figure 2: Suppliers ranked by purchase value

The cumulative purchase value of suppliers was then calculated and the top 80% of suppliers was identified, see Figure 3.

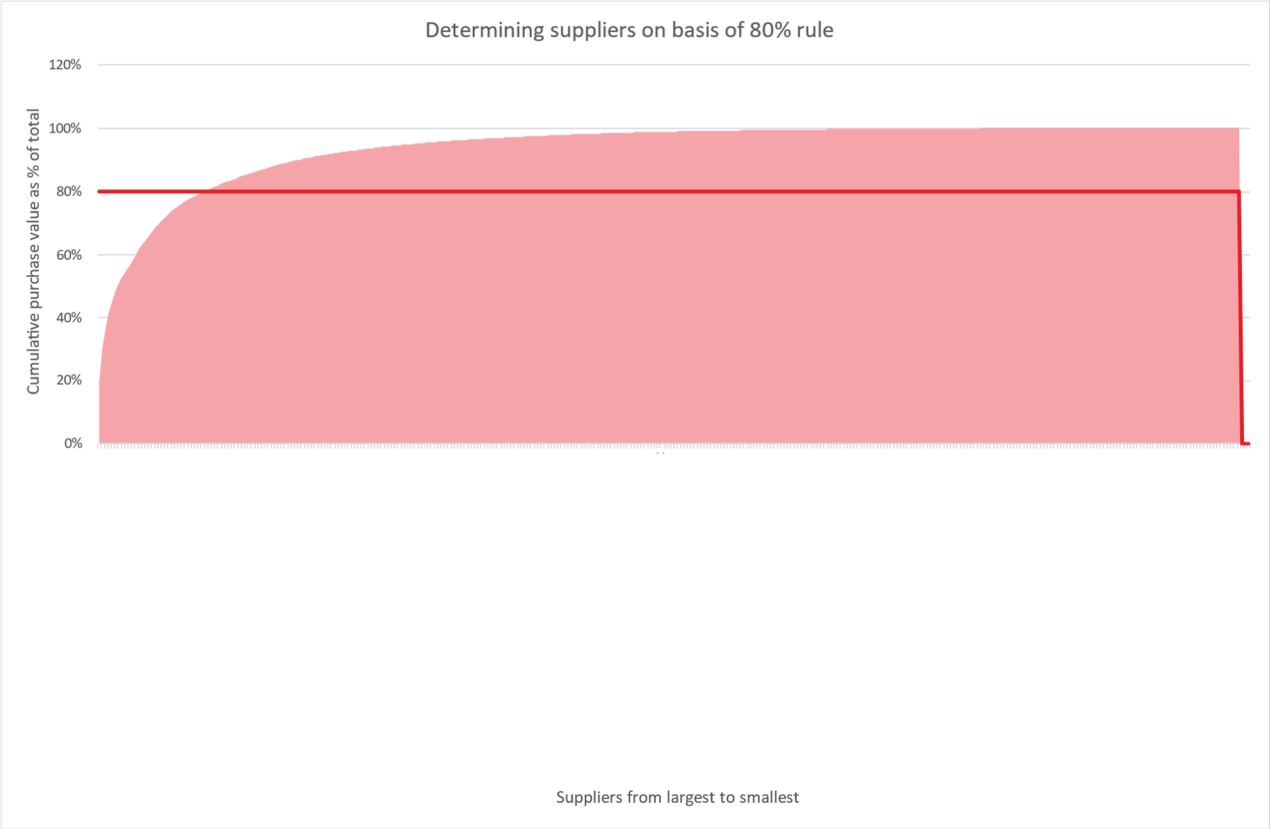

Figure 3: Identification of top 80% of suppliers

This results in the 33 suppliers shown in Table 1 being included in the analysis.

Table 1: : List of Suppliers included in analysis

Supplier	Total Spend with Supplier	Description	Supplier of Goods or Services
		Architects	Services
		Pension Fund	Services
		Engineering	Services
		Landlord	Services
		Project Collaborator - Architect	Services
		Subconsultant	Services
		Subconsultant	Services
		Subconsultant	Services
		Client	Services
		Contractor	Services
		Architect	Services
		M&E Services	Services
		Accountancy Services	Services
		Project Collaborator	Services
		Engineering	Services
		Consortium Partner	Services
		IT Equipment	Goods
		Subconsultant	Services
		Outside Consultants Project	Services
		Archaeologist	Services
		IT Services	Services
		Catering Services	Services

Supplier	Total Spend with Supplier	Description	Supplier of Goods or Services
		Subconsultant	Services
		Subconsultant	Services
		Contractor	Services
		Project Collaborator	Services
		Subconsultant	Services
		Insurance	Services
		Project Collaborator	Services
		Engineering	Services
		Outside Consultants Project	Services
		HR Automation Services	Services
Total			

Stage 2 – Calculation of CO2 emissions

A database of UK Department for Environment, Food and Rural Affairs (DEFRA) emissions factors developed by the Centre of Sustainability Accounting (CenSA) has been used to estimate CO2 emissions based on the cost of the goods and services. See Appendix D for details. These emissions factors are based on data from 2011, at this time there is not a more recent update to the data so costs have been indexed accordingly.

7. Each supplier has assigned a product category according to the Standard Industrial Classification (SIC) Codes 2007.
8. The total kg of CO2 per £ is read from the DEFRA emissions factor database for each product category.
9. The spend per supplier has been indexed from 2021 to 2011 prices[1] and then converted to GBP using an average exchange rate for 2011[2] to calculate a 2011 £ equivalent spend per supplier.
10. The total kg of CO2 per £ is then multiplied by the 2011 £ equivalent spend to estimate the CO2 emissions per supplier.

This calculation is shown in Appendix E.

Table 2 gives the CO2 emissions for the goods suppliers. The total CO2 emissions for the goods suppliers identified within the top 80% of suppliers is 37,390.81kg from a total of 1 goods supplier.

[1] 1:1.17 from 2011 to 2021 (https://www.worlddata.info/europe/netherlands/inflation-rates.php)

[2] 0.8678 average exchange rate in 2011 (https://www.exchangerates.org.uk/EUR-GBP-spot-exchange-rates-history-2011.html#:~:text=Average%20exchange%20rate%20in%202011,GBP%20on%2009%20Jan%202011)

Table 2: CO2 emissions for Goods Suppliers

Good Supplier	2011 £ Equivalent Spend	SIC Code	Product Category SIC Code (SIC 2007)	kg CO2e/£	Total kg CO2e
		26	Computer, electronic and optical products	0.41	37,390.81
				Total	**37,390.81**

Table 3 gives the CO2 emissions for each services supplier. The total CO2 emissions for the services suppliers identified within the top 80% of suppliers is 999,700 kg CO2e from a total of 31 services suppliers.

Table 3: CO2 emissions for Service Suppliers

Service Supplier	2011 £ Equivalent Spend	SIC Code	Product Category SIC Code (SIC 2007)	kg CO2e/£	Total kg CO2e
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		65.1-3	Insurance, reinsurance and pension funding services, except compulsory social security & Pensions	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		68.1-2	Real estate services, excluding on a fee or contract basis and imputed rent	0.13	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		68.1-2	Real estate services, excluding on a fee or contract basis and imputed rent	0.13	
		41-43	Construction	0.37	

Service Supplier	2011 £ Equivalent Spend	SIC Code	Product Category SIC Code (SIC 2007)	kg CO2e/£	Total kg CO2e
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		81	Services to buildings and landscape	0.25	
		64	Financial services, except insurance and pension funding	0.15	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		62	Computer programming, consultancy and related services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		62	Computer programming, consultancy and related services	0.18	
		56	Food and beverage serving services	0.40	
		80	Security and investigation services	0.24	
		74	Other professional, scientific and technical services	0.16	
		41-43	Construction	0.37	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		70	Services of head offices; management consulting services	0.17	
		65.1-3	Insurance, reinsurance and pension funding services, except compulsory social security & Pensions	0.18	

Service Supplier	2011 £ Equivalent Spend	SIC Code	Product Category SIC Code (SIC 2007)	kg CO2e/£	Total kg CO2e
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		71	Architectural and engineering services; technical testing and analysis services	0.18	
		66	Services auxiliary to financial services and insurance services	0.15	
				Total	**999,700**

3. Analysis of the data

3.1 Comparison with ER Net GHG Reduction Plan

Striving towards Net Zero, in August 2020 the Europe Region produced the ER Net GHG Reduction Plan. The plan identifies purchased goods and services to account for 63% of Arup's global emissions and 68% of the Arup Europe Region emissions based on 2018 data, see Appendix G. The plan goes on to set out actions including:

- Reduce purchases like catering, stationery and events by 50%
- Reduce emissions of goods from top 20 suppliers by 20%

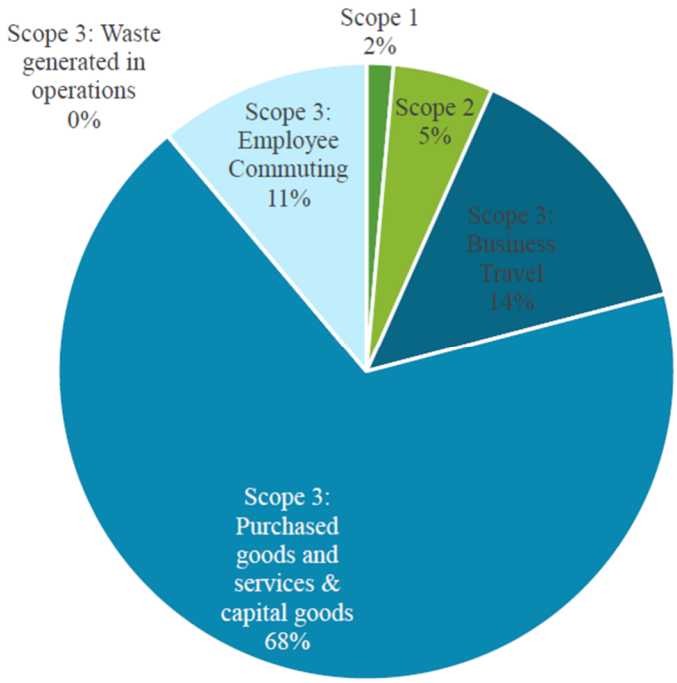

Figure 4: Distribution of Europe Region CO2 Emissions from ER GHG Reduction Plan (2018 data)

Intuitively the proportion of emissions from purchased good and services appears very high. The analysis in this report can be used to interrogate this. For 2021 the Arup Netherlands emissions are as seen in Table 4 and Figure 5.

Table 4: Arup Netherlands 2021 CO2 Emissions

Scope	Emissions (kg CO2e)
Scope 1	806
Scope 2	167,038
Scope 3: Employee Commuting	9,874
Scope 3: Business Travel	31,504
Scope 3: Purchased goods & services	1,037,090

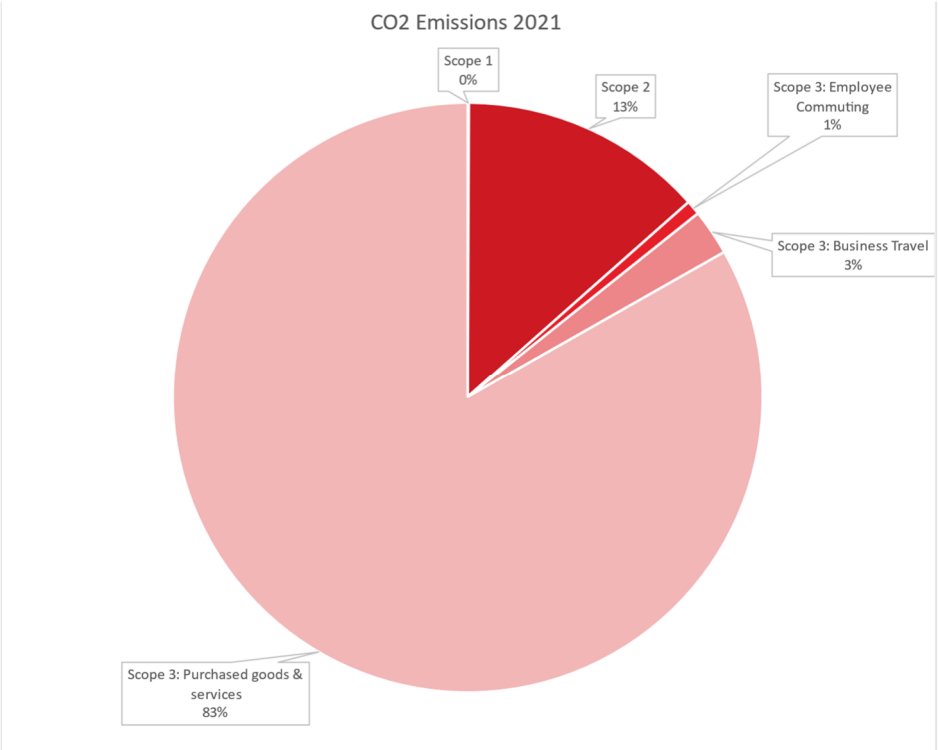

Figure 5: Arup Netherlands CO2 Emissions 2021

This shows the emissions from purchased goods and services to be 83%, considerably higher than the ER figure of 68%. One possible explanation for this is the influence that the pandemic has had on the way we now work, in particular the impact on office occupancy, commuting and business travel. For a more accurate comparison between the Netherlands data and the ER data, the Netherlands 2019 emissions have also been considered. For ease of calculation, the emissions from purchased goods and services have been converted to 2019 values using the currency exchange rate whereas actual emissions values for the other categorises have been used. It is assumed that the value of purchased goods in 2019 is similar to those in 2021.

Table 5: Arup Netherlands 2019 CO2 Emissions

Scope	Emissions (kg CO2e)
Scope 1	52,289
Scope 2	113,021
Scope 3: Employee Commuting	102,976
Scope 3: Business Travel	409,060
Scope 3: Purchased goods & services	1,167,850

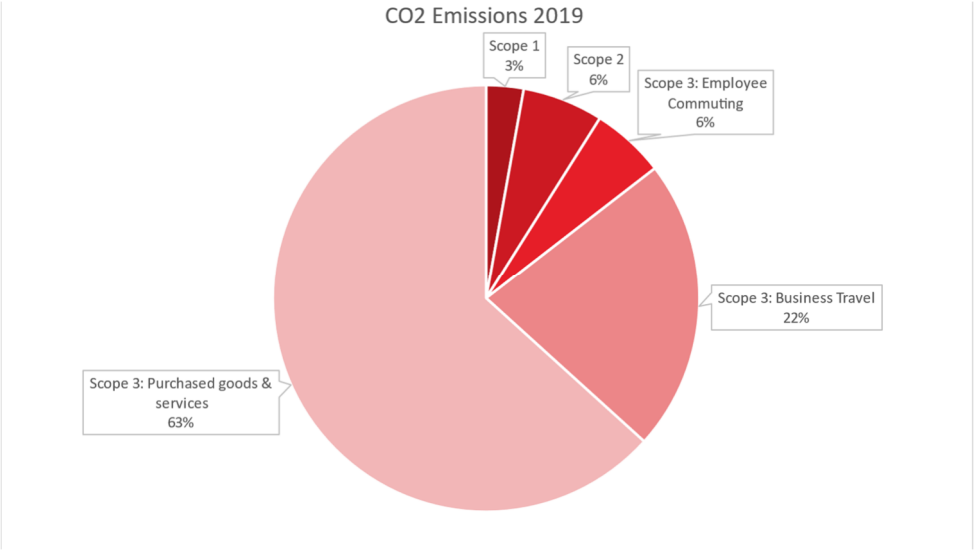

Figure 6: Arup Netherlands CO2 Emissions 2019

In 2019, pre-pandemic, office occupancy, commuting and business travel emissions were higher than in 2021. However the contribution to emissions from purchased goods and services was still considerable at 63%.

3.2 Accuracy of the DEFRA Emissions Factors

The DEFRA emissions factor database was used in both sets calculations. These factors are based on data from 2011 and may no longer be accurate. This can be tested with the Arup 2021 office data.

Table 6: Calculation of an emissions factor based on Arup office 2021 data

2021 emissions for Arup NL (excluding purchasing)	209223	kg Co2e
FTE 2021	251	FTE
Average hourly rate	100	€/hr
2021 turnover	38,391,000	€
2021 € to £ exchange rate	0.8597	
Converted 2021 turnover	33,004,642	£
Arup 2021 emissions factor	**0.006**	**kg Co2e / £**

Arup is categorised as SIC Code 71 "Architectural and engineering services; technical testing and analysis services" which has a DEFRA emissions factor of 0.18 kg CO2e per £. This is almost 30 times higher than the actual emissions factor calculated using the Arup office 2021 data.

Assuming that all emissions factors are similarly over estimated the actual emissions produced, say conservatively by 25 times, the overall emissions from purchased goods and services would be 1,037,090 / 25 = 41,484 kg CO2e. In this case Scope 3 purchased good and services would be 16% of the overall CO2 emissions, as shown in Figure 7.

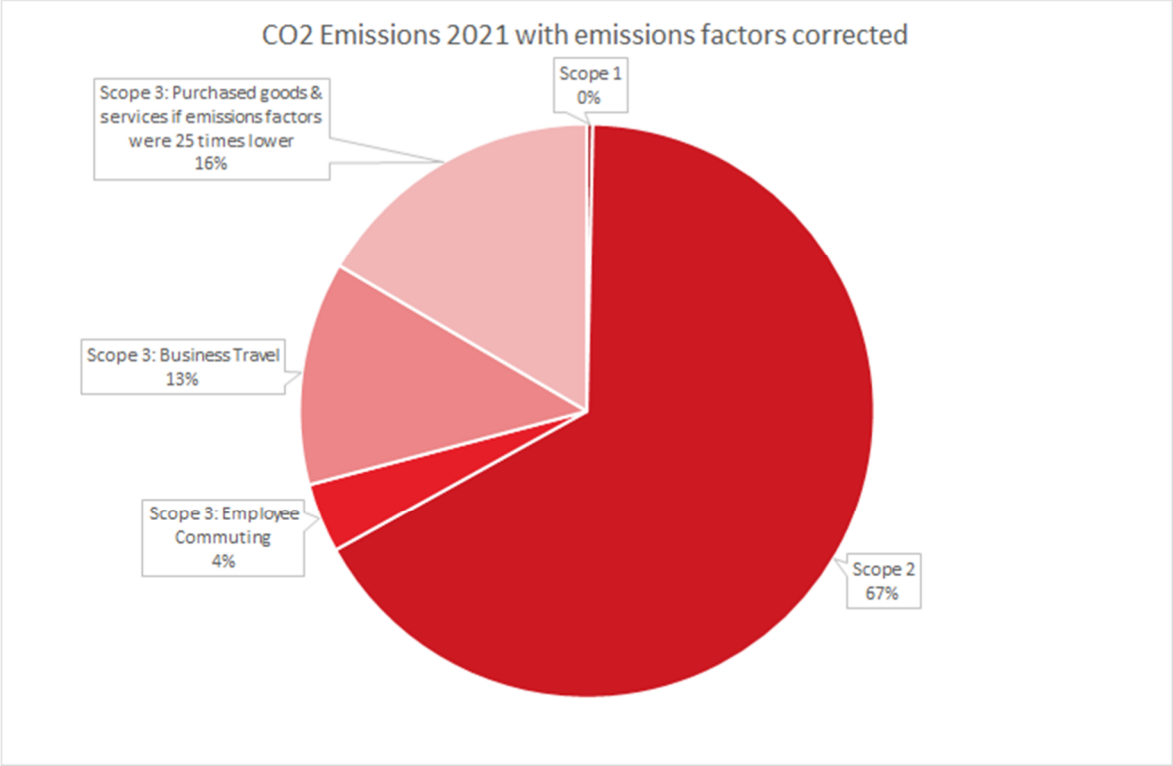

Figure 7: Arup Netherlands CO2 Emissions 2021 with emissions factors corrected

4. Findings

The key findings from this Upstream CO2 emissions analysis are:

- Service suppliers make up the majority of the assessment boundary of the Arup Netherlands Upstream Supply Chain.
- is the only goods supplier that is included in the assessment boundary. The is essential for the operation of Arup. measures and reports their sustainability impact[3] and have various awards and accreditations nationally and internationally such as 2021 Energy Star Partner of the Year.
- CO2 emission contributions from purchased good and services are very difficult to calculate. Section 3 of this report shows that the emissions can be calculated as between 16% and 83% depending on the dataset and emissions factors used.
- A crude comparison of the DEFRA emissions factors with a calculated Arup NL office emissions factor show that the DEFRA emissions factors are likely to be highly inaccurate although there is no better alternative calculation method at this time.
- CO2-Prestatieladder requirement 5.A.1 is satisfied through this report.
- Regarding CO2-Prestatieladder requirement 5.A.2, at this time it is not considered possible to influence the emissions of our upstream supply chain further. Our proposal is to investigate a number of our service providers to determine whether we can calculate their carbon footprint to doublecheck the current figures.

3

- A final option is to contact the DEFRA or its successors to determine if new factors are available.

Appendix A

Summary of Invoices - Financial Year 2020/21

Redacted

Appendix B

Suppliers removed from the analysed supplier list

The following suppliers were removed from the analysis because their emissions are already included within the existing Arup Netherlands CO2 emission analysis:

Removed Suppliers

The following suppliers were removed from the analysis because they had negative invoices:

Removed Suppliers

Appendix C

List of ranked suppliers and cumulative purchase values

Redacted

Appendix D

DEFRA Emissions Factors

Department for Environment, Food and Rural Affairs

"Table 13" Indirect emissions from the supply chain

Last updated:	Mar/14	Version:	2.00

This table only covers indirect emissions from the supply chain and include CO_2, CH_4, N_2O and F-gas emissions. Indirect emissions are those which are generated by other organisations as part of the process of providing goods and services to your company.

How to use this table

This table is intended to be used primarily as a high-level diagnostic tool/for initial scoping/estimating. **If you have more specific information about the supply chain emissions of any particular product then that source should be used instead.** Such adjustments should be clearly documented.

This table also includes a number of activities that are also covered in other models, such as coal, fuels refined from crude oil, mains electricity, gas, water and for various modes of transport. **If you have more specific/detailed information for such activities that will enable you to make calculations of emissions using the emission factors in the other models these should be used in preference to the factors in this table as they will be more specific.** However, the information in this table may still be useful for a rough initial calculation of the relative importance of these activities in the first instance.

The table below provides emission factors for spending on different groups of products:

1) Identify the amount spent on different product groups (in actual prices in £s, including VAT).

2) Multiply the amount of spending by the conversion factor to get total emissions in kilograms of carbon dioxide equivalent (kg CO_2e). The excel spreadsheet does this automatically following your entry of the amount of spending into the appropriate box.

For example, if £1000 is spent on 'textiles' (in purchasers' prices) in 2011, then the table calculates that 963 kilograms of CO_2e were released during all stages of the production of these goods, including raw material extraction, processing, manufacturing, transportation, packaging etc. As a result, these emissions factors are different from the emission factors shown in the other annexes. They are similar to life-cycle emissions, but do not take into account direct emissions by your company, which may be included in life-cycle estimates (e.g. from the actual combustion of fuel by your company).

Key information:

This table can be used to produce indicative estimates of the Greenhouse Gas emissions relating to the production of goods and services purchased by your company. The estimates can only be indicative as they represent the average emissions relating to each product group, and the emission factors relating to specific products within the group may be quite different. If you have specific information about the supply chain emissions of any particular product then this source should be used instead.

The information derived from this table can be combined with data on direct emissions, i.e. those relating to actual fuel use (e.g. litres of fuel used, or derived from mileage estimates). The footnotes to the table give more information about what the factors shown in the table mean in terms of purchases of energy products and transport services.

Are these factors directly comparable to those in the other models?

No. The emission factors provided in this table are for the supply chain emissions of GHG resulting from the production and transportation of broad categories of goods and services. They express Scope 2 and 3 emissions as defined by the GHG Protocol. Because they encompass all the supply chain impacts (i.e. indirect emissions), these emission factors are **not directly comparable** with those from other models, which generally **only** include emissions from the point of use.
See also

http://www.ukconversionfactorscarbonsmart.co.uk/

https://www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses

Which products are included in which categories?

Some guidance is available in the comment boxes in the Table. The categories are based upon the Standard Industrial Classification (SIC): further information on the SIC 2007 is available here:

UK Standard Industrial Classification 2007 (UK SIC 2007) - ONS

Do the factors take into account emissions relating to imported goods, and those relating to the formation of capital assets used in making the products?

The factors are for products supplied for consumption in the UK but do take account of the emissions relating to the production of products imported for intermediate consumption (i.e. those products that are used by UK industries in the process of supplying products for consumption in the UK. The estimates do not incorporate any allowance for emissions relating to the formation of capital assets, whether in the UK or overseas.

How were these factors calculated?

The factors are based on a model of the economy, known as the input-output model, which describes in monetary terms how the goods and services produced by different sectors of the economy are used by other sectors to produce their own output. These monetary accounts are linked to information about the greenhouse gas emissions of different sectors of the economy. For the factors in this Annex an input-output model of the world economy was used with two distinct regions - the UK and the Rest of World.

By using the input-output model, the industrial emissions are then attributed to final products bought by consumers. The result is an estimate of the total upstream emissions associated with the supply of a particular product group.

The supply chain emission factors are expressed on a purchasers' price basis in real terms (i.e. the actual sales price in that year including taxes on products and distribution margins). It may be advisable to take subsequent price changes into account when using the factors shown below. It should also be noted that emissions in more recent years may have changed because of subsequent changes in the structure and emissions intensity of the supply chain since 2011.

Table 13	Supply chain emission factors for spending on products: kgCO per £	2011		Scope 3 Total GHG	
SIC code (SIC 2007)	Product category	Amount spent by product category 2011 (£)	x	Total kg CO_2e per £	Total kg CO_2e
01	Agriculture products[2]		x	3.10	
02	Forestry products		x	0.75	
03	Fish products[2]		x	0.93	
05	Coal, lignite, peat[3]		x	2.97	
06 & 07	Crude petroleum and natural gas & Metal ores		x	0.66	
08	Other mining and quarrying products		x	0.81	
09	Mining support services		x	0.24	
10.1	Preserved meat and meat products		x	1.40	
10.2-3	Processed and preserved fish, crustaceans, molluscs, fruit and vegetables		x	0.97	
10.4	Vegetable and animal oils and fats		x	0.99	
10.5	Dairy products		x	1.82	
10.6	Grain mill products, starches and starch products		x	1.33	
10.7	Bakery and farinaceous products		x	0.78	
10.8	Other food products		x	0.96	
10.9	Prepared animal feeds		x	1.27	
11.01-6	Alcoholic beverages		x	0.74	
11.07	Soft drinks		x	0.60	
12	Tobacco products		x	0.56	
13	Textiles		x	0.96	
14	Wearing apparel		x	0.68	
15	Leather products		x	0.54	
16	Wood and wood products		x	1.02	
17	Paper and paper products		x	1.18	
18	Printing and recording services		x	0.58	
19	Coke and refined petroleum products		x	1.69	
20A	Industrial gases, inorganics and fertilisers (all inorganic chemicals) - 20.11/13/15		x	0.72	
20B	Petrochemicals - 20.14/16/17/60		x	0.69	
20C	Dyestuffs, agro-chemicals - 20.12/20		x	1.02	
20.3	Paints, varnishes and similar coatings, printing ink and mastics		x	1.66	
20.4	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations		x	1.44	
20.5	Other chemical products		x	1.57	
21	Basic pharmaceutical products and pharmaceutical preparations		x	0.35	
22	Rubber and plastic products		x	0.96	
23OTHER	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive products - 23.1-4/7-9		x	2.19	
23.5-6	Manufacture of cement, lime, plaster and articles of concrete, cement and plaster		x	1.27	
24.1-3	Basic iron and steel		x	2.59	
24.4-5	Other basic metals and casting		x	1.56	
25OTHER	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9		x	0.57	
25.4	Weapons and ammunition		x	0.68	
26	Computer, electronic and optical products		x	0.41	
27	Electrical equipment		x	0.62	
28	Machinery and equipment n.e.c.		x	0.56	
29	Motor vehicles, trailers and semi-trailers		x	0.62	
30.1	Ships and boats		x	0.76	
30.3	Air and spacecraft and related machinery		x	0.59	
30OTHER	Other transport equipment - 30.2/4/9		x	0.49	
31	Furniture		x	0.64	
32	Other manufactured goods		x	0.45	
33.15	Repair and maintenance of ships and boats		x	0.69	
33.16	Repair and maintenance of aircraft and spacecraft		x	0.56	
33OTHER	Rest of repair; Installation - 33.11-14/17/19/20		x	0.41	
35.1	Electricity, transmission and distribution		x	3.62	
35.2-3	Gas distribution[3]		x	2.01	
36	Natural water; water treatment and supply services		x	0.57	
37	Sewerage services; sewage sludge		x	0.81	
38	Waste collection, treatment and disposal services; materials recovery services		x	1.36	
39	Remediation services and other waste management services		x	0.27	

41-43	Construction[4]		x	0.37	
45	Wholesale and retail trade and repair services of motor vehicles and motorcycles		x	0.30	
46	Wholesale trade services, except of motor vehicles and motorcycles		x	0.35	
47	Retail trade services, except of motor vehicles and motorcycles		x	0.31	
49.1-2	Railway transport[5]		x	0.56	
49.3-5	Road transport[5]		x	0.78	
50	Water transport[5]		x	1.90	
51	Air transport[5]		x	3.00	
52	Warehousing and support services for transportation		x	0.28	
53	Postal and courier services		x	0.35	
55	Accommodation services		x	0.45	
56	Food and beverage serving services		x	0.40	
58	Publishing services		x	0.23	
59-60	Motion picture, video and TV programme production services, sound recording & music publishing & programming and broadcasting services		x	0.22	
61	Telecommunications services		x	0.32	
62	Computer programming, consultancy and related services		x	0.18	
63	Information services		x	0.18	
64	Financial services, except insurance and pension funding		x	0.15	
65.1-3	Insurance, reinsurance and pension funding services, except compulsory social security & Pensions		x	0.18	
66	Services auxiliary to financial services and insurance services		x	0.15	
68.1-2	Real estate services, excluding on a fee or contract basis and imputed rent		x	0.13	
68.2IMP	Owner-Occupiers' Housing Services		x	0.11	
68.3	Real estate services on a fee or contract basis		x	0.09	
69.1	Legal services		x	0.10	
69.2	Accounting, bookkeeping and auditing services; tax consulting services		x	0.12	
70	Services of head offices; management consulting services		x	0.17	
71	Architectural and engineering services; technical testing and analysis services		x	0.18	
72	Scientific research and development services		x	0.24	
73	Advertising and market research services		x	0.20	
74	Other professional, scientific and technical services		x	0.16	
75	Veterinary services		x	0.20	
77	Rental and leasing services		x	0.23	
78	Employment services		x	0.14	
79	Travel agency, tour operator and other reservation services and related services		x	0.16	
80	Security and investigation services		x	0.24	
81	Services to buildings and landscape		x	0.25	
82	Office administrative, office support and other business support services		x	0.18	
84	Public administration and defence services; compulsory social security services		x	0.27	
85	Education services		x	0.17	
86	Human health services		x	0.25	
87-88	Social care services		x	0.29	
90	Creative, arts and entertainment services		x	0.24	
91	Libraries, archives, museums and other cultural services		x	0.25	
92	Gambling and betting services		x	0.17	
93	Sports services and amusement and recreation services		x	0.29	
94	Services furnished by membership organisations		x	0.15	
95	Repair services of computers and personal and household goods		x	0.22	
96	Other personal services		x	0.27	
97	Services of households as employers of domestic personnel		x	0.04	
	TOTAL				**0**

Source Calculated by Centre for Sustainability Accounting (CenSA), Leeds, http://www.censa.org.uk
Defra (enviro.statistics@defra.gsi.gov.uk) should be the first point of contact.

Notes

[1] Agricultural and fish products are those bought direct from farmers or the fisheries industry. Where products have been prepared for consumption they should be treated as products from the food and

[2] These emissions relate to the activities of the industries engaged in the extraction of energy carriers. Where fuels are processed before use then the factors identified by footnote 3 should be used.

[3] These emission factors relate to the supply and distribution of energy products for general consumption, and take into account emissions relating to the extraction and processing of the energy carriers (e.g. oil refineries). Except in the case of electricity, they do not include emissions relating to your company's use of the energy. In the case of electricity, these factors include the emissions relating to the production of the fuels used to generate the electricity, whereas those shown in Annex 3 of the 2009 Defra / DECC GHG Conversion Factors are limited just to emissions from the use of those fuels by the electricity producers.

[4] These factors relate to spending on construction projects, not to emissions relating to construction projects in the supply chain.

[5] These factors relate to transport services for hire or reward (including public transport services), not to emissions from vehicles owned by your company (for which estimates of actual fuel use should be used).

Appendix E

Calculation of kg CO2 emissions per supplier

Redacted

Appendix F

Arup Netherlands Office CO2 Emissions 2021

Redacted

Appendix G

Extract from ER GHG Emissions Reduction Plan

Redacted