



Carbon Footprint Report 2023

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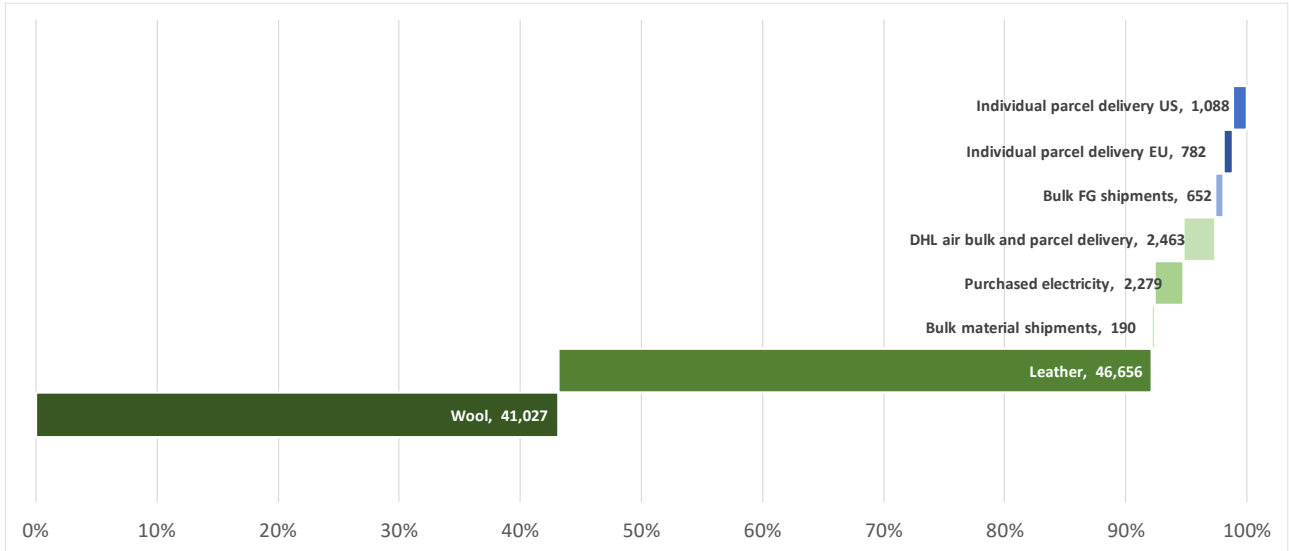
Summary

Carbon Footprint KOW Lifestyle Manufacturing				Carbon Footprint	U/M
			what and how		
KLC	Scope 3 Upstream	Wool	footprint per KG of wool, multiplied by KG bought	41,027	KG CO2e
KLC	Scope 3 Upstream	Leather	footprint per M2 of leather, multiplied by M2 bought	46,656	KG CO2e
KLC	Scope 3 Upstream	Bulk material shipments	list out all incoming shipments modality, origin, weight run through calculator	190	KG CO2e
KLC	Scope 1 Direct	Company Facilities	Negligible emissions from company processes		
KLC	Scope 2	Purchased electricity	Add up all electricity bills for 2020 Multiply the kWh with the estimated Thai emissions per kWh, as this is where most power comes from	2,279	KG CO2
KLC	Scope 3 Downstream	DHL air bulk and parcel delivery	Calculate parcel delivery emissions from SR to different standard locations (DHL) take these calculations to come to a CAM fulfillment footprint	2,463	KG CO2

Carbon Footprint KOW Lifestyle Europe				Carbon Footprint	U/M
KLE	Scope 3 Upstream	Bulk FG shipments	list out incoming shipments, modality, origin, weight run through calculator	652	KG CO2e
KLE	Scope 1	Company facilities	Negligible emissions from company processes		
KLE	Scope 2	Purchased electricity	Negligible purchase of electricity		
KLE	Scope 3 Downstream	Individual parcel delivery EU	Calculate parcel delivery emissions from EU and US warehouse to set number of locations use this to estimate average delivery emissions run through calculator	782	KG CO2e
KLE	Scope 3 Downstream	Individual parcel delivery US	Take the US parcel average multiplied by number of sales and returns	1,088	KG CO2e

Grand total Footprint 2023

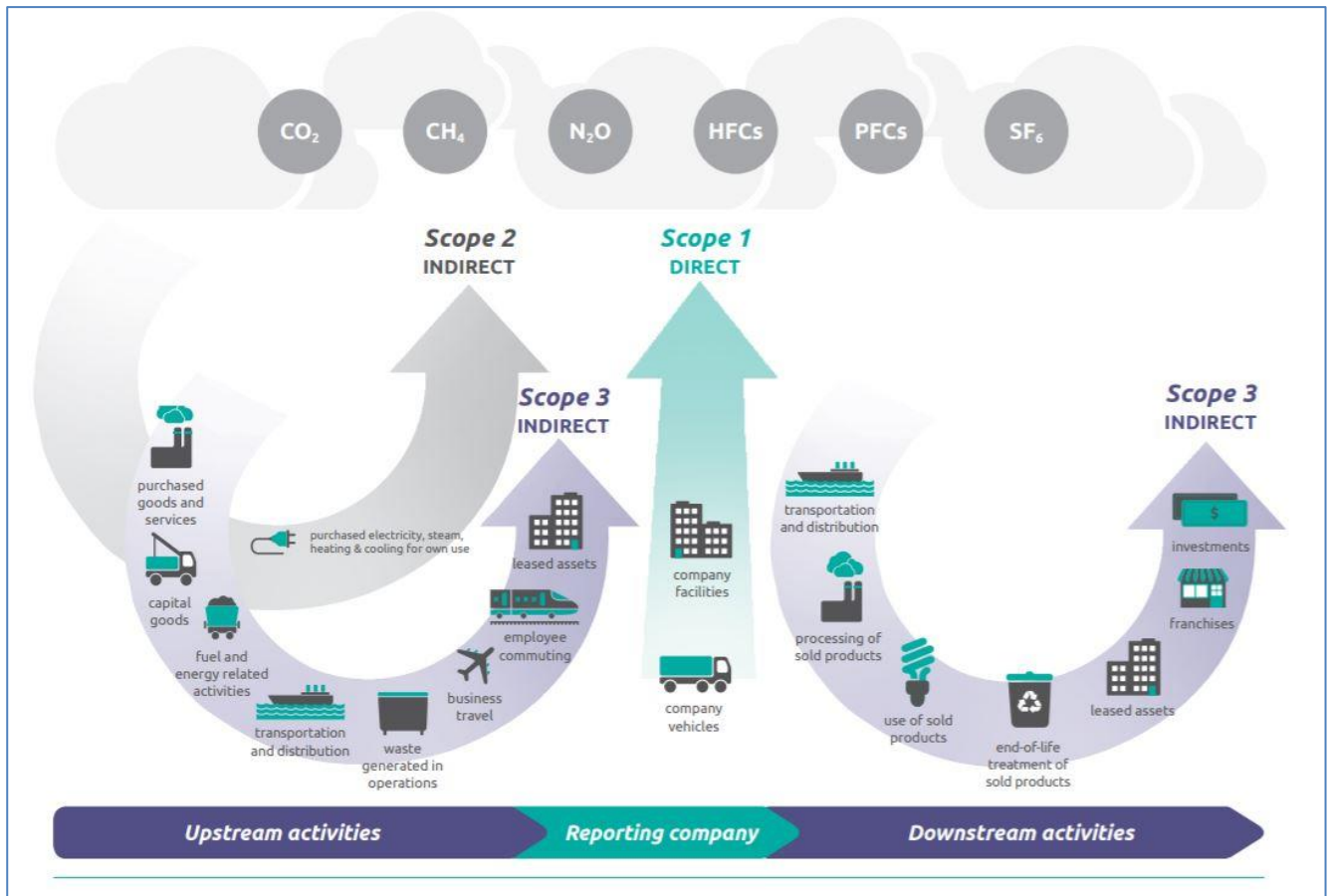
95,137



Methodology

For 2023, we use the carbon footprint standards of the GHG Protocol Corporate Standard. This means that we try to scope the direct and indirect emissions of one year of operation of the company.

We use the below graph to determine the scope of this report:



Two companies one report

Kingdom of Wow as a brand runs two companies.

- KOW Lifestyle Europe – established in the Netherlands. Scope of activity: procure and sell our own branded footwear through retail and web shops fulfilled from third party stock locations, marketing, and sales activities
- KOW Lifestyle Manufacturing – established in Cambodia. Scope of activity: procurement of raw materials, production of branded footwear, local sales, some fulfilment direct from factory, but most product is sold to KOW Lifestyle Europe.

In this report we try to capture the full supply chain from the procurement of raw material by KOW Lifestyle Manufacturing to the parcel delivery to the end customer by KOW Lifestyle Europe

Scope

KOW Lifestyle Manufacturing (Cambodia)

Category	Element	KOW description	In/out scope
Scope 1 direct	Company facilities	Small workshop buildings, no carbon emissions	Out
	Company vehicles	No company vehicles	Out
Scope 2 indirect	Purchased electricity, steam, heating, and cooling for own use	Electricity used for aircon, lighting, light equipment	In
Scope 3 indirect upstream	Leased assets	No leased assets	Out
	Employee commuting	Short distances by motorbikes, negligible	Out
	Business travel	No business travel in 2023	Out
	Waste generated in production	Natural materials used, plastic packing materials reduced, negligible	Out
	Transportation and distribution	Incoming raw materials	In
	Fuel and energy related activities	No activities of this kind purchased	Out
	Capital goods	Not considered material. Also, outside our capacity to calculate	Out
	Purchased goods and services	Services negligible in size and outside our capacity to calculate Raw materials we include the materials most used: wool and leather, for accessories we have no capacity yet to calculate	In
Scope 3 indirect downstream	Transportation and distribution	All KOW intercompany transports are covered by KOW Europe Direct wholesales are in scope	In
	Processing of sold products	Consumer product, no more processing	Out
	Use of sold products	At best we can say that warm feet reduce requirement of heating in homes, but other than that, not relevant	Out
	End-of-life treatment of sold products	Products 99% biodegradable and containing short cycle carbon (wool fibres, leather) so neutral at full-life cycle of materials	Out
	Leased assets	None	Out
	Franchises	None	Out
	Investments	None	Out

KOW Lifestyle Europe (Netherlands)

Category	Element	KOW description	In/out scope
Scope 1 direct	Company facilities	No physical office, any work done and covered by the Cambodia office	Out
	Company vehicles	No company vehicles	Out
Scope 2 indirect	Purchased electricity, steam, heating, and cooling for own use	No physical office	Out
Scope 3 upstream	Leased assets	No leased assets	Out
	Employee commuting	No commute	Out
	Business travel	No business travel in 2023	Out
	Waste generated in production	No activities	Out
	Transportation and distribution	Incoming finished goods	In
	Fuel and Energy related activities	No activities of this kind purchased	Out
	Capital Goods	No capital goods	Out
	Purchased Goods and Services	We purchase accountancy and warehousing services. Outside our capacity to calculate the emissions. We do purchase green webhosting services.	Out
Scope 3 indirect downstream	Transportation and Distribution	Outgoing parcel deliveries to customers	In
	Processing of sold products	Consumer product, no more processing	Out
	Use of sold products	At best we can say that warm feet reduce requirement of heating in homes, but other than that, not relevant	Out
	End-of-life treatment of sold products	Products 99% biodegradable and containing short cycle carbon (wool fibres, leather) so neutral at full-life cycle of materials	Out
	Leased assets	None	Out
	Franchises	None	Out
	Investments	None	Out

Considerations for the future

Intensity vs absolute targets

For the future we are looking to include carbon intensity calculations to be able to benchmark ourselves against other footwear brands.

Materials and scope

Due to our limited capacity being a small company, we had to choose to focus the two main materials of the slippers. We have ambitions to include more materials in future reports. We are also contacting our key suppliers for their actions to reduce and/or offset their footprint, allowing us to procure already reduced or neutral materials. We have found a better data source for the carbon footprint per kg of wool.

Sources of emission numbers

We have done research in emissions for the materials and the (main logistic) services that we use. Where there was any doubt, we have chosen the highest emission numbers for our calculations. But it must be acknowledged that many products and services, standards are not yet generally available online.

In order to be accountable and receive feedback on better sources, we have included our source for each emission. Feedback is very welcome.

First Reduce, offset what is left

We completed this calculation and report for the first time over 2020. This gave us great insight as to where our footprint is created, and how this is distributed. 2022 is our third report using the same methodology.

You will see in this report that the footprint for wool and leather used far exceeds any of the other impacts. Currently we do not have alternatives to using wool and leather for our products.

For the resulting carbon footprint, we look for certified projects that we can use to offset our carbon emissions.

History

4 years of history

Year	Footprint	Remark
2020	50,474 kg CO2-e	There was a sizeable mistake in the leather footprint calculation of 21,963 kg CO2-e. It is added in this overview we added this to our 2021 offset purchase.
2021	100,110kg CO2-e	We bought 400% more wool in 2021.
2022	118.030kg CO2-e	In 2022 we experienced a low growth curve. Resulting in only a slightly higher carbon footprint
2023	95,137kg CO2-e	The footprint is lower because we had one wool shipment less than last year. This is partly countered as we found improved data that suggests a higher wool footprint.

Offset of 2023

Carbon offset can be arranged across the globe in many ways. We have chosen to look for a project that has a relevant connection for us. We have donated to this project since the completion of our first Footprint Report.

We are aware of discussions on the carbon offsetting claims. For this year we have chosen to remain with the plan. See where things are heading. We may switch in the future.

Stand For Trees – Southern Cardamom.

This project works in one of the most beautiful tropical forests in Cambodia. It offers the purchase of carbon offset credits, working in accordance with REDD+, which is a UN approved model specially created to fight climate change by saving forests.

REDD+ also means that in additional to the carbon offset, there is positive impact on biodiversity, livelihoods, wildlife habitat and much more.

Kingdom of Wow likes this comprehensive approach.



Note to the Board

This report will be discussed in the next board meeting to establish a high-level confirmation and support for footprint reducing decisions that we can take during the year.

- Anchor our principle and objective for a carbon neutral operation through initial emission reduction and offsetting the footprint that is left.
- Purchase climate neutral services as much as possible, or include an offset option when available (i.e. flights and transportation services)
- Make energy saving investments in the Kingdom of Wow Cambodia office
- Source more sustainable materials with a smaller footprint where possible

KOW Lifestyle Manufacturing

Scope 3 Indirect Upstream

Material: Wool

What we measure

Carbon footprint per kg of wool

Sources

Publication	Conclusion	
"Greenhouse gas emissions profile for 1 kg of wool produced in the Yass Region, New South Wales: A Life Cycle Assessment approach" <u>Source used for reports 2020-2022</u>	24.9	kg CO ₂ e greasy wool at farm gate
"Factors Allowing Users to Influence the Environmental Performance of Their T-Shirt", Empa, Swiss Federal Laboratories for Materials Science and Technology, 2021. This article uses data from the Ecoinvent Database. <u>Source used for this report</u>	36.7	kg CO ₂ e wool yarn

- From the above article we learn that "wool has a relatively high carbon footprint [..]. This is due to the methane emissions of sheep (56%), manure emissions of dinitrogen monoxide (16%), and the soybean for feeding sheep (17%).
- Although we use a different yarn type (thick knitting yarn) compared to the thin wool yarns used to make t-shirts. We don't believe the final spinning of the yarn makes a material difference in its footprint. Especially as 89% of the footprint is created when the wool is still connected to the sheep.

Standard we use

36.7 kg CO₂e

Wool purchases

PO-2023-017-Bamboo and Wool Yarn	1117.9	kg
Total	1117.9	Kg

Total Carbon Footprint

KG of wool	Carbon footprint per kg	Total footprint	Unit
1117.9	36.7	41,026.93	Kg CO ₂ -e

Material: Leather

Sources

Publication	Conclusion	
Water, energy, and carbon footprints of a pair of leather shoes	0.12	kg CO ₂ e cow leather production
Analysing the carbon footprint of the finished bovine leather: a case study of aniline leather	64.8	kg CO ₂ e per square meter of finished aniline leather

Standard we use

64.8 kg CO₂e

Leather purchases

PO2023-001 Suede Leather	3000	ft2	suede cow leather skins
PO2023-009 Suede Leather	5000	ft2	suede cow leather skins
Total	8000	ft2	

Convert kg to m²

Shipments	8000	ft2	suede cow leather skins
convert	729	m2	

Total Carbon Footprint

m ² of leather	Carbon footprint per kg	Total footprint
720	64.8	46,656 kg CO ₂ -e

Material Shipments

We use the multi-modality CO₂ Emissions Calculator from Carbon Care to calculate the emissions of all incoming bulk shipments, including the trucking at the country of origin and the trucking in Cambodia

Shipment Reference	type of goods	KOW unit	Import/Export	Origin	Destination	Weight of shipment	Freight Modality	Route	Carbon	U/M	remark
PO-2023-001 Suede Leather	Leather	KOW CAM	Import	Guangzhou	Siem Reap	255	Truck	Guangzhou-SR	36	CO ₂ e	Total Emissions WTW
PO2023-009 Suede Leather	Leather	KOW CAM	Import	Guangzhou	Siem Reap	425	Truck	Guangzhou-SR	60	CO ₂ e	Total Emissions WTW
PO-2023-017 Yarn	Yarns	KOW CAM	Import	Shanghai	Siem Reap	1341	Sea-Truck	Shanghai - SHV - SR	94	CO ₂ e	Total Emissions WTW

Source: <https://www.carboncare.org/en/co2-emissions-calculator.html>

Date: 2024-05-15

Total Emission from incoming material shipments

190 kg CO₂e WTW

Scope 1 Direct

Negligible emission

The production process in our workshop itself has no greenhouse gas emission.

Scope 2 Indirect Energy

Purchased electricity

Total energy bill for 2022

Date	Amount Energy	unit	Memo/Description	Amount
2023 full year	5,697	kWh	Electricity in Jan - Dec 2023	\$1,424.50

Carbon emission per kWh

We take the Thai average as much of the electricity we use is imported from Thailand.

They also publish official numbers. Source: <http://www.eppo.go.th/index.php/en/en-energystatistics/indicators>

Year	CO ₂ /kWh (kg-CO ₂ / kWh)
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2023	0.400
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Carbon Emission Calculation

kWh used	Emission per kWh	Electricity Carbon Footprint	U/M
5,697	0.400	2,278.80	kg CO ₂

Scope 3 Indirect Downstream

Individual Parcel Delivery

We have seen an increase in direct DHL shipments from KOW Lifestyle Manufacturing to customers in countries closer to Cambodia than our standard fulfilment locations or for rush replenishment. We have also used DHL Air for some bulk shipments that were too small for ocean freight.

Below, in the table of individual deliveries

- We use one destination per country and the carbon footprint for all shipments into that country.
- Our product including packaging weighs on average 400 grams. We use 0.5kg as a standard weight
- We use the DHL Carbon Calculator

size of shipment	Weight	Route	modality	Carbon	U/M	number of shipments	Total Carbon
Single Package	0.5kg	Australia	air	3	KG CO ₂ e WTW	5	15
Single Package	0.5kg	Canada	air	4.38	KG CO ₂ e WTW	3	13.14
Single Package	0.5kg	India	air	1.61	KG CO ₂ e WTW	1	1.61
Single Package	0.5kg	Malaysia	air	0.51	KG CO ₂ e WTW	1	0.51
Single Package	0.5kg	United Kingdom	air	3.88	KG CO ₂ e WTW	9	34.92
Single Package	0.5kg	United States	air	5.17	KG CO ₂ e WTW	53	274.01
Total						72	339.19

size of shipment	Weight	Route	modality	Carbon	U/M
Batch shipment FEDEX 23 Feb Touch of Modern	29.8kg	Siem Reap - Los Angeles	air	292.88	KG CO ₂ e WTW
Batch shipment FEDEX 30 Sep replenishment	56.7kg	Siem Reap - Los Angeles	air	555.75	KG CO ₂ e WTW
Batch shipment FEDEX 13 Oct replenishment	29.9kg	Siem Reap - Los Angeles	air	293.07	KG CO ₂ e WTW
Batch shipment DHL 13 Nov Kickstarter	33.5kg	Siem Reap - Los Angeles	air	328.35	KG CO ₂ e WTW
Batch shipment DHL 24 Nov Kickstarter + replenishment	32.5kg	Siem Reap - Los Angeles	air	325.42	KG CO ₂ e WTW
Batch shipment DHL 13 Dec replenishment	33.5kg	Siem Reap - Los Angeles	air	328.35	KG CO ₂ e WTW
Total				2123.82	

Total Emission from air freight parcel and bulk delivery

2463.01 kg CO₂e WTW

KOW Lifestyle Europe

Scope 3 Indirect Upstream

KOW Lifestyle purchases products (slippers and shoes) from KOW Lifestyle Manufacturing in Cambodia. They buy EXW, so the full shipment footprint is allocated to KOW Lifestyle Europe

Shipment Reference	type of goods	KOW unit	Import/Export	Origin	Destination	Weight of shipment	Freight Modality	Route	Carbon	U/M	remark
P2022-248 Slippers KOW FVB June Shipment	Foot wear	KOW CAM	Export	Siem Reap	Aphen aan de Rijn	4539	Truck-Sea-Truck	SR-SHV SHV-RTD RTD-Alphen	505	CO2e	Total Emissions WTW
P2023-078 Slippers KOW FVB August Shipment	Foot wear	KOW CAM	Export	Siem Reap	Aphen aan de Rijn	1322	Truck-Sea-Truck	SR-SHV SHV-RTD RTD-Alphen	147	CO2e	Total Emissions WTW

Total Emission Bulk Imports

652 kg CO_{2e} WTW

Webhosting

Our web builder and digital marketing agency Olive & Lake provides us with 100% green hosting services.



Scope 1 Direct

Negligible emission

We run sales and marketing activities from Cambodia. They would not have process emissions anyways, apart from a little bit of steam coming from ears when Amazon changed their product listing requirements again.

Scope 2 Indirect Energy

Negligible emission

We do not run any physical office in the Netherlands or the US.

Scope 3 Indirect Downstream

Individual Parcel Delivery EU

For parcel delivery we have calculated the emissions for an average distance, multiplied with the number of sales.

Average parcel delivery distance

size of shipment	Dimensions	Route	modality	Carbon	U/M
Single Package	1kg - 0.05m ³	Nuenen - Amsterdam	Truck	0.14	kg CO _{2e} WTW

Source: DHL carbon calculator

Packaging footprint

Assuming similar footprint as in US on packaging (see below)

one standard packaging box	1	kg CO _{2e}
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Total Emission from Parcel Delivery EU

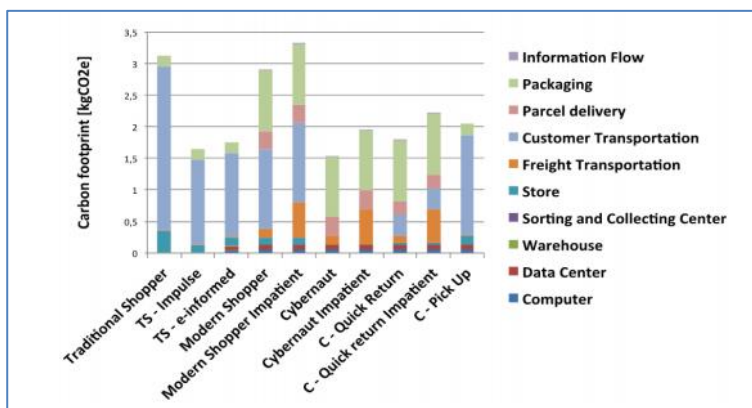
Transaction type	Number of sales and returns	Carbon footprint (KG)	Total footprint
Sale	767	1	767
Return	108	0.14	15.12
	875		782.12

Individual Parcel Delivery US

We have used research on average carbon footprint in the US of one product (toy) bought online.

Source: https://ctl.mit.edu/sites/default/files/library/public/Dimitri-Weideli-Environmental-Analysis-of-US-Online-Shopping_0.pdf

Below a graph that shows carbon footprints for different types of consumers.



We noticed that the packaging is a considerable part of the footprint at about 1kg. So, we decided to use that also for our EU footprint calculation.

To use in KOW calculations

The footprint of the Cybernaut impatient	2kg	CO ₂ e
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Number of US parcels

Taken from sales table	564
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Total Emission from Parcel Delivery US

Transaction type	Number of sales and returns	Carbon footprint (KG)	Total footprint
Sale	524	2	1048
Return	40	1	40
Total	564		1088