

# CO<sub>2</sub> and LCA Summary

Based on the life cycle  
of frames Neil and Pierce



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# Introduction

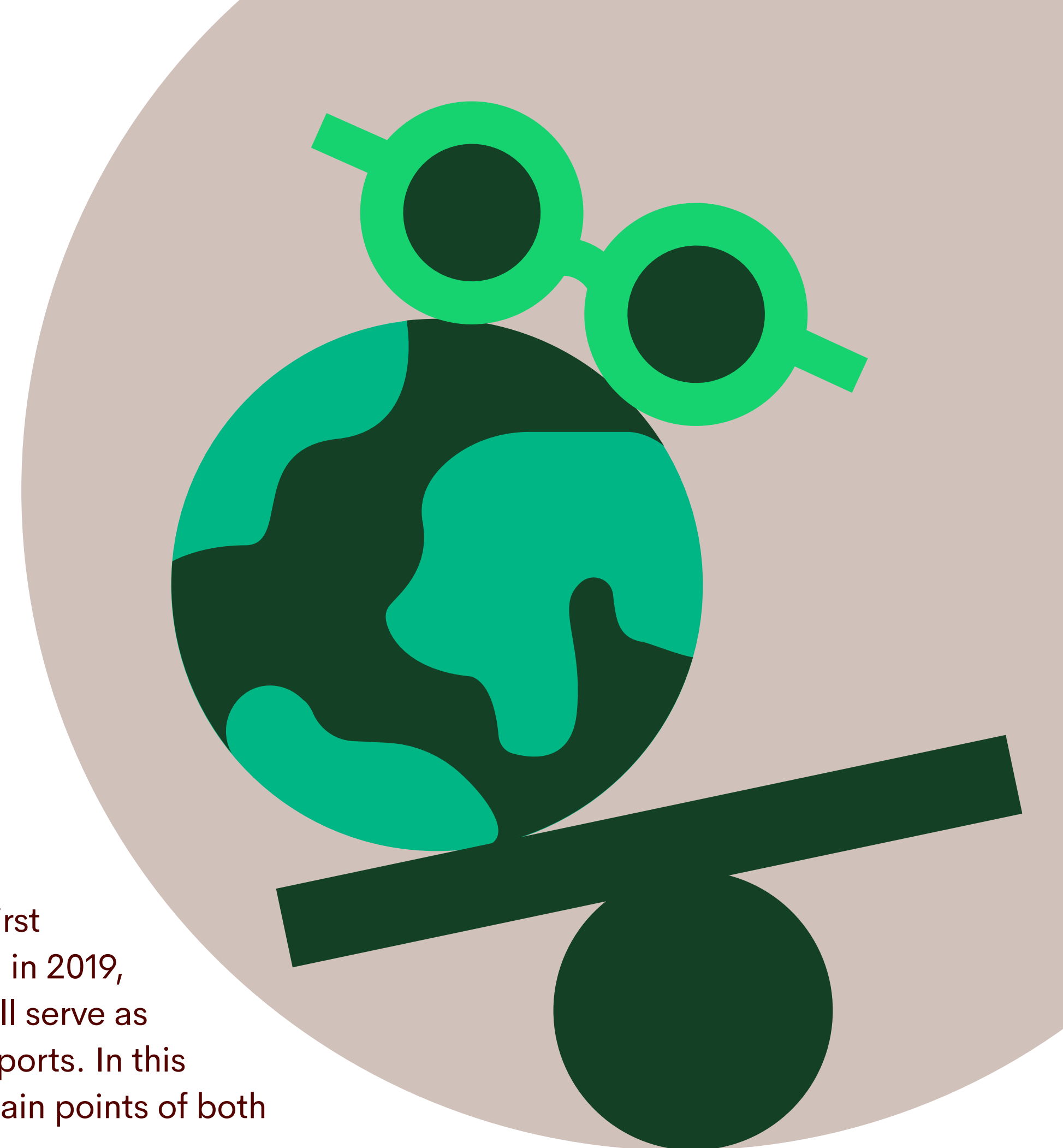
**Business as usual will not save the planet.**

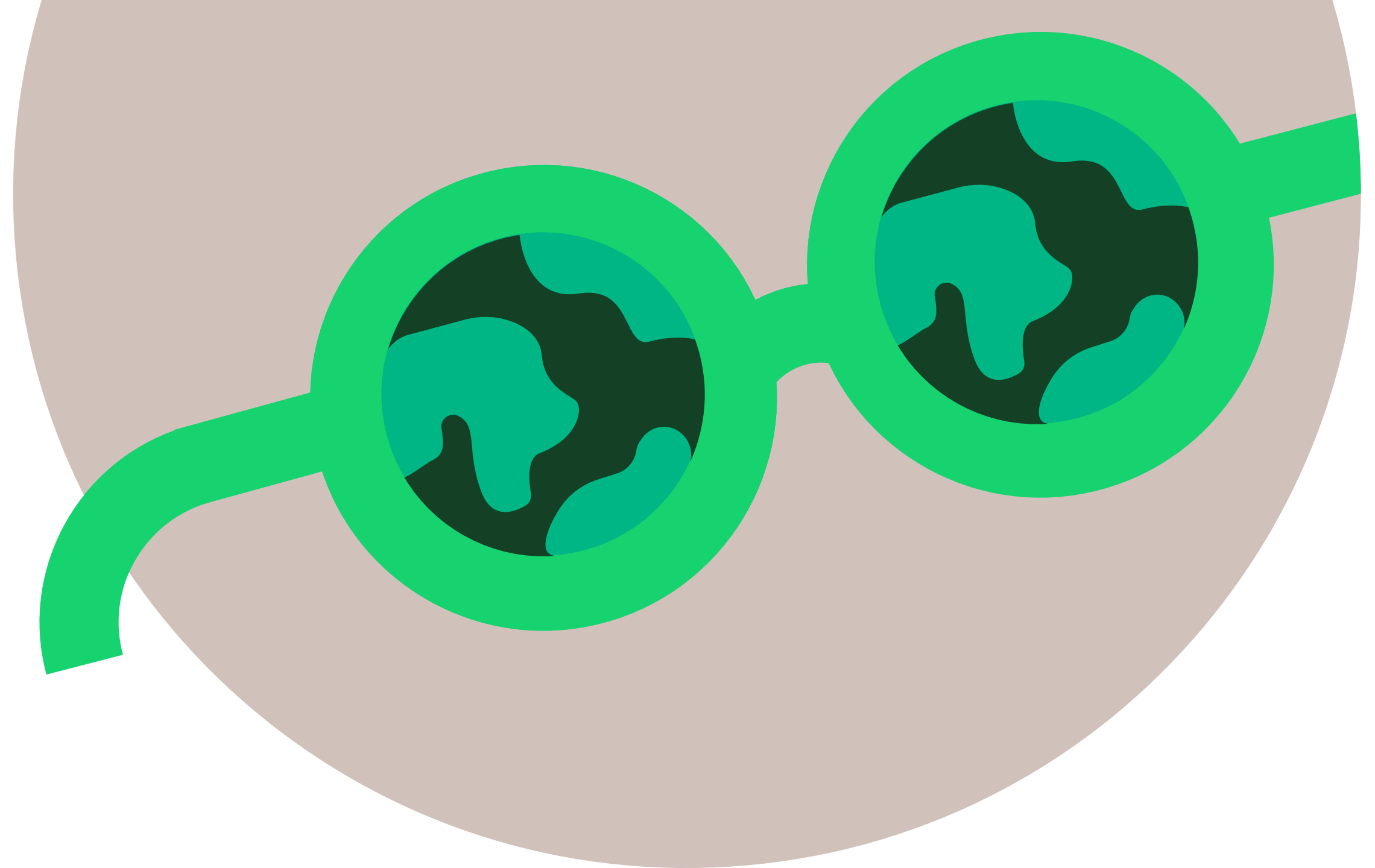
For Ace & Tate, it's important to measure our environmental footprint and transparently report on how we're working to reduce it. To do this properly we need to understand what our impact is and where it comes from. This is the summary of the second, externally validated Life Cycle Analysis (LCA) of Ace & Tate's impact.

Over 2019, we measured the resources required to make our products and what the footprint of our operation adds up to. Together with our partner Sustainalize, we carried out a carbon footprint analysis (CO2 Report), and a Life Cycle Assessment (LCA). If you're interested, you can really dig in and read the full LCA and CO2 reports.

The goal of these reports is for Ace & Tate to have reliable data to feed our sustainability strategy moving forward. The first official reports were published in 2019, based on the year 2018 and will serve as a bench-mark for our future reports. In this summary we breakdown the main points of both these reports.

Environmental reports are conducted after every fiscal year to have the full overview of the yearly impact. This year our LCA and CO2 report were postponed due to COVID-19, and therefore include 2020 achievements.





## Reporting on environmental impact

When reporting on environmental impact, we cover our direct and indirect impact.

Both reports are expressed in a common unit: ton CO<sub>2</sub> -equivalents. It's an international standard that translates the main greenhouse gas emissions (GHGs) into a single number.

### › CO<sub>2</sub> Report

The CO<sub>2</sub> report quantifies the impact of all our direct business activities, such as the energy used by our stores and during business travel.

### › Life Cycle Assessment

The LCA quantifies the environmental impact of our indirect business activities as a result of making our product. This ranges from the waste of raw materials to the use of water and energy during manufacturing, transport and its end-of-life. The LCA does not include the construction of our stores. The LCA covers multiple types of environmental impact such as; CO<sub>2</sub> emissions, water, toxicity, phosphate (impact on biodiversity) usage of non-renewable goods such as fossil fuels.

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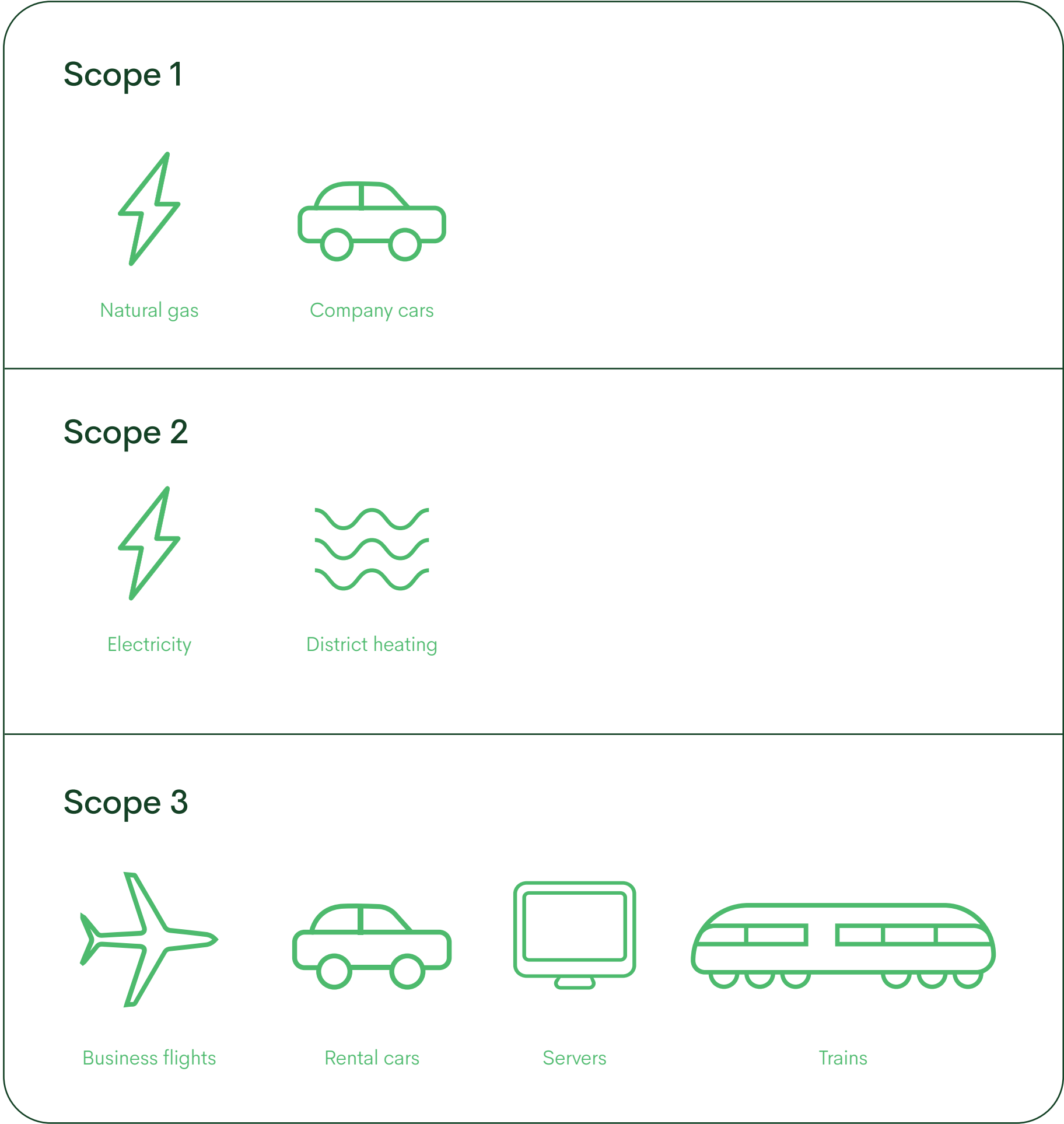
# CO<sub>2</sub> Footprint Report

The CO2 Report analyses the greenhouse gas emissions that contribute to global warming from our direct business activities where Ace & Tate has a high level of operational control, not necessarily financial control. That isn't common. The choice of approach may change how emissions are categorised when operational boundaries are set.

Financial controls are the means by which an organisations resources are directed, monitored, and measured (ability to direct the financial and operating policies).

A company has operational control over an operation if they or one of its subsidiaries has the full authority to introduce and implement its operating policies at the place of operation.

It's important to note that we added more stores to our family this year, as well as more data sources to our report, which may account for increases in some areas. This year we've included district heating, servers and travel by train to our scopes. Including these gives us a clearer picture of what our emissions are and how we can reduce them. We are committed to going the extra mile.



The operational control scenario includes all (leased) store locations, our Head Office and leased vehicles for the year 2019. On a more detailed level, Ace & Tate included the following emissions to define its baseline carbon footprint. This approach to determine organisational control conforms to the greenhouse gas emissions (GHGs) Protocol.

**Scope 1:** Direct emissions from retail locations, Head Office and leased vehicles (mandatory reporting)

- › Emissions of natural gas from energy in stores and offices operated by Ace & Tate
- › Emissions from leased vehicles over which Ace & Tate has operational control
- › Hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment over which Ace & Tate has operational control

**Scope 2:** Indirect emissions from purchased electricity (mandatory reporting) emissions are reported via both the location-based approach (average mix in country) and market-based approach (specific energy purchase by asset)

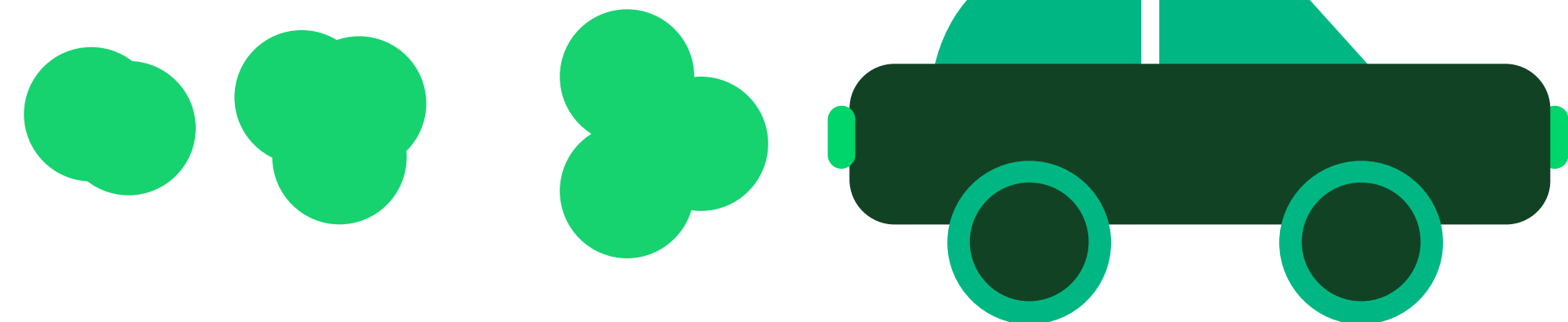
- › Electricity usage by stores and offices over which Ace & Tate has operational control
- › District Heating

**Scope 3:** all other indirect emissions (voluntarily reporting)

- › Business air travel
- › Business train travel
- › By the company rented, car travel
- › Server data

Reporting requires data and the more company-specific the data, the more accurate the results.

For the CO2 Report, our teams collected data on electricity use and kilometres travelled by air, train or car from our Head Office, and stores. Where location-specific data was not available, Sustainalize used compatible market-based benchmarks to execute and externally validate the calculations.

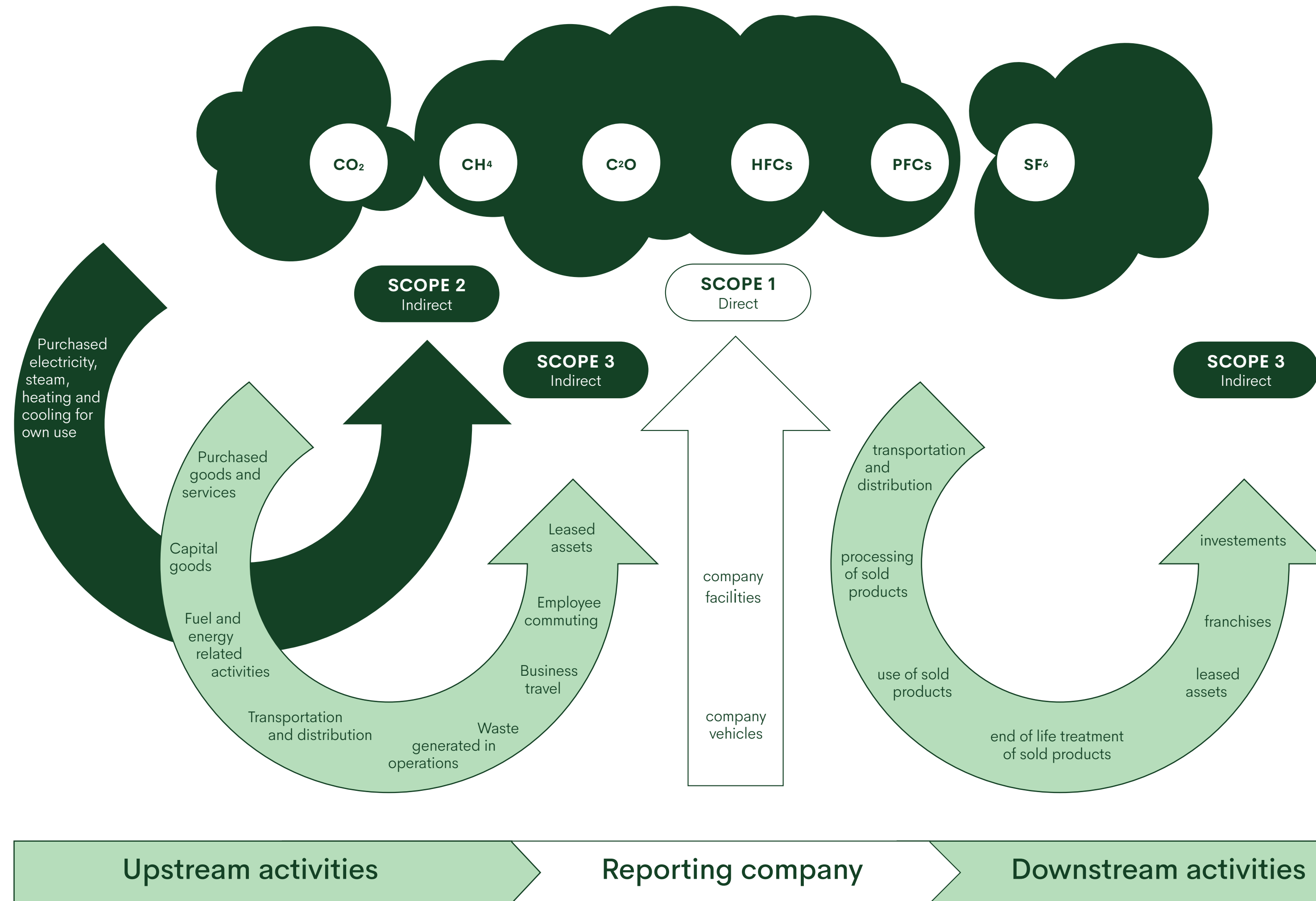




Organisational boundary

Ace & Tate reports its Scope 1, 2 and upstream scope 3 emissions (see figure 1 on Scope) via the operational control approach.

This means Ace & Tate accounts for 100% of emissions from operations over which it or one of its subsidiaries has operational control.



Scope 3 is included in our [LCA report](#).

Results

The total amount of greenhouse gas emissions by Ace & Tate's operations over 2019 is 427,53 Tons CO2 - eq, which equals:

- > **13.360** jeans,
- > **142.510** hours of Netflix,
- > **53** households (energy and transport),
- > **249** return tickets AMS-NY.

Direct emissions 2019		(In Tons CO2-eq.)	
Scope 1	Natural gas	72.72	76.68
	Petroleum	3.96	
Scope 2	Electricity (market-based)	111.26	162.32
	District heating	51.06	
Scope 3	Flights	185.75	188.70
	Rented vehicles	0.92	
	Trains	0.01	
	Servers	1.85	
<b>TOTAL Emissions</b>		<b>427,53 CO2-eq.</b>	

CO2 Footprint							
Total emission:							
2018	310,04* ton CO2-eq.	103.347 hours of binge watching	6.200.800 cups of coffee	180 return tickers to NY	173.207 t-shirts	9.689 pair of jeans	39 households (energy and transport)
2019	427,53* ton CO2-eq.	142.510 hours of binge watching	8.550.600 cups of coffee	249 return tickers to NY	238.844 t-shirts	13.360 pair of jeans	53 households (energy and transport)

\* Market-based

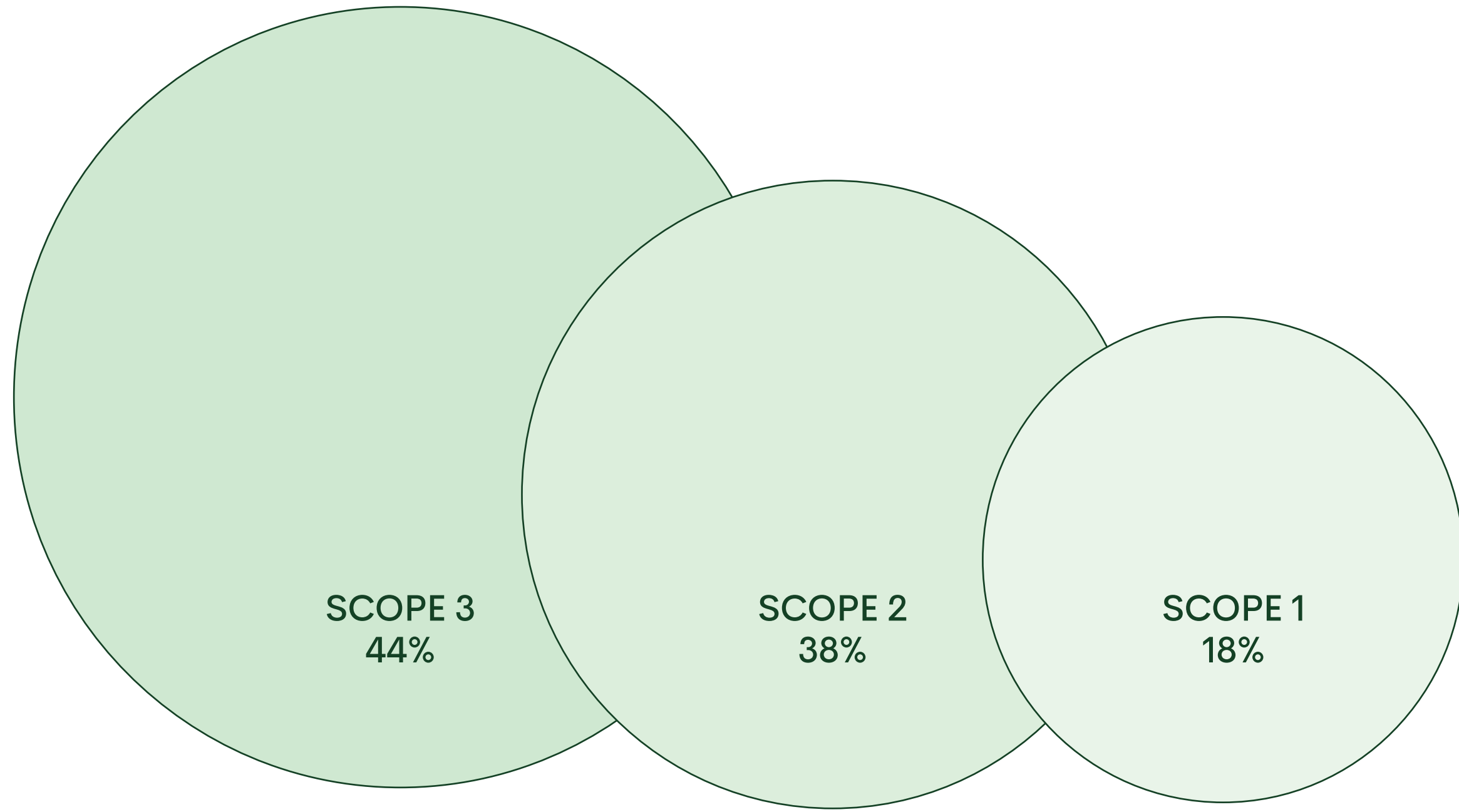
2019 Results in percentage

Of our total emissions, over 44% can be attributed to business travel and server use (scope 3). The second largest contributor to emissions is our electricity and gas usage in stores (scope 2).

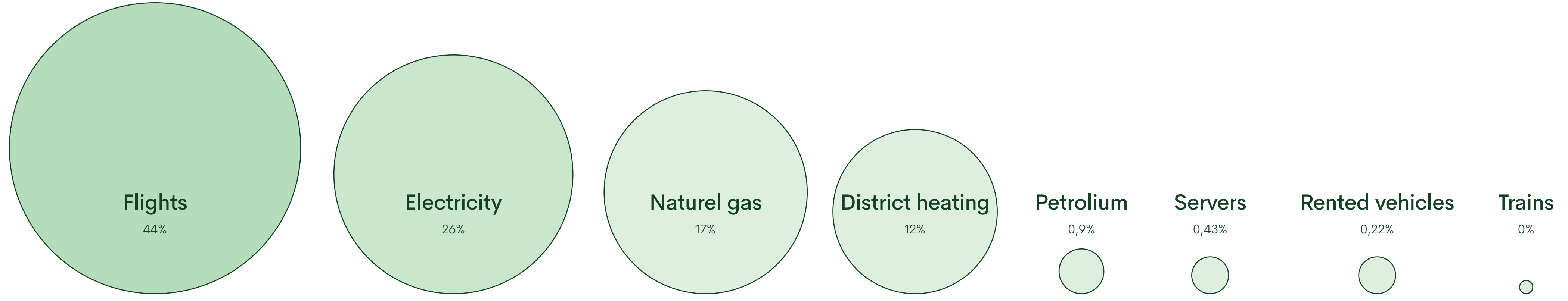
These numbers form the basis of our responsibility strategy. They help us identify areas where there's room for improvement.

Reporting on our impact annually allows us to see to what extent our carbon reduction initiatives from the previous year have payed off.

Impact % per scope



Total % of all direct impact



		2018	2019	Explanation	Next steps
<b>Scope 1</b>	Natural gas	78,28	● 72,72	Difference in data quality, since part of the stores report district heating instead of natural gas.	Continue switching to green energy. Improve energy efficiency of existing and new facilities.
	Petroleum	1,96	● 3,96	Increased usage of lease car.	Switch to a fully electric lease car. This is on the Supply Chain 2021 roadmap.
<b>Scope 2</b>	Electricity (market-based)	133,05	● 111,26	Decrease as a result of stores switching to renewable electricity.	Introduce new energy efficiency measures. Switch remaining stores to renewables.
	District heating	N/A	51,06	Not in scope in 2018.	Improve energy efficiency of existing and new facilities.
<b>Scope 3</b>	Flights	96,04	● 185,75	Increase due to sharp rise in store openings and future expansion explorations – specifically NY.	Introduce the travel policy and carbon budget. > Usage of train over plane > Only travel when necessary (virtual meetings)
	Rented vehicles	0,70	● 0,92	Increased usage of Greenwheels.	Use fully electric car share services.
	Trains	N/A	0,01	Not in scope in 2018.	Incentivise train travel over air travel. Set positive target for train travel if flights decrease.
	Servers	N/A	1,85	Not in scope in 2018.	Change to more energy efficient or CO2 neutral server provider.
<b>TOTAL</b>		310,04 CO2-eq.	427,53 CO2-eq.		

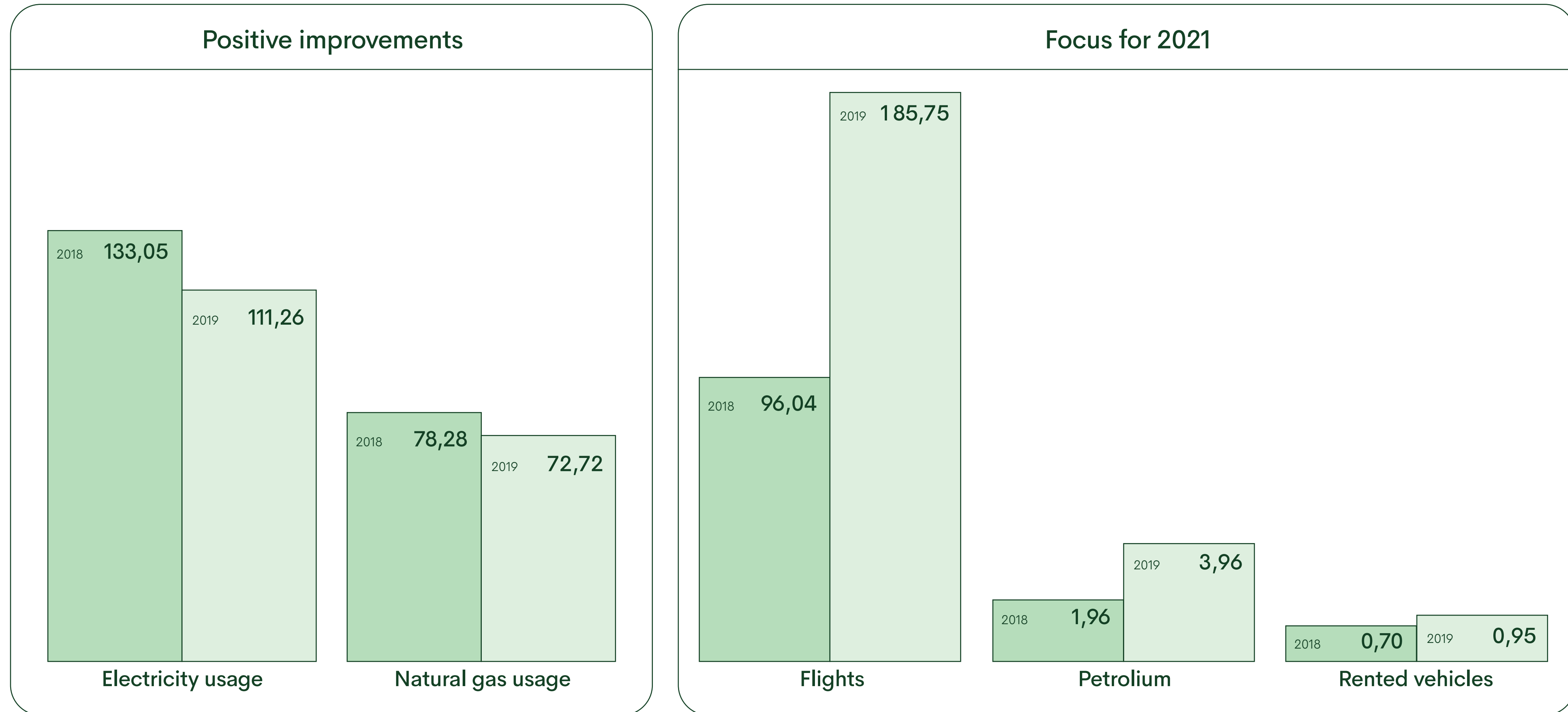
NB: Figures in the above table are expressed in ton Co2 -eq.

● Packaging material references used

● Use phase references used

## Biggest impacts 2019 versus 2018

Comparing our 2019 CO<sub>2</sub> -eq. impact to our 2018 base year gives us a clear insight into where we've improved and where we still have room to grow. Pictured below are the largest impact areas. With this in mind, our future efforts to reduce these numbers can be better targeted.



NB: Figures above are expressed in kg CO<sub>2</sub> -eq.

02

# Life Cycle Analysis

Report

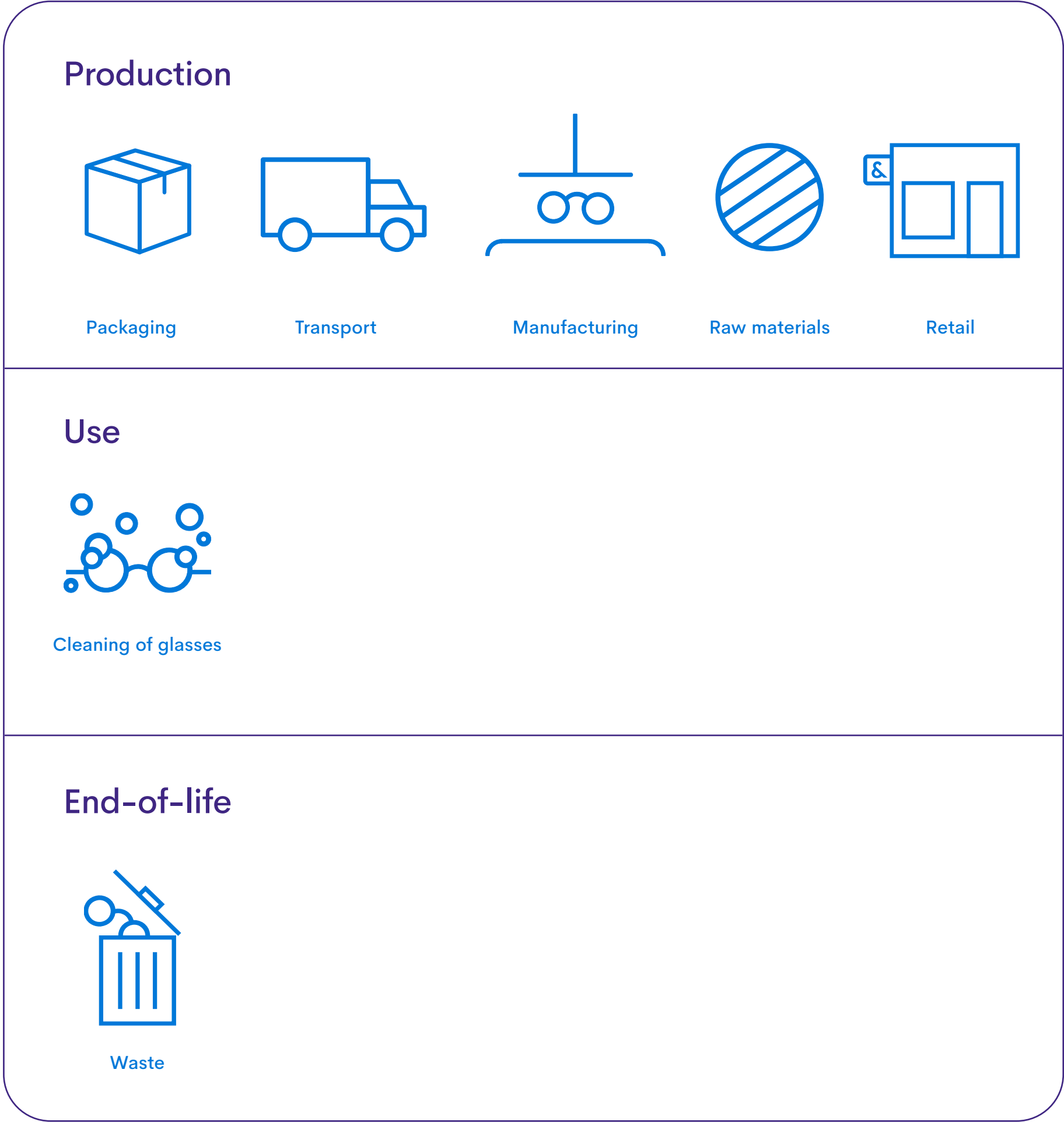
A Life Cycle Assessment (LCA) quantifies the environmental impact of all indirect business activities by looking at the life cycle of the product—including its carbon footprint. It includes everything from sourcing materials, manufacturing and transport to disposal.

The goal of the LCA is to understand the impact of our frames and make informed decisions to reduce this impact effectively in the future.

The LCA is conform the ReCiPe model and includes the environmental impact of:

- > Production of required raw materials;
- > Energy needed to produce the product;
- > Necessary transport for distribution;
- > Waste processing of excess materials discarded during production.

The analysis considers the full life cycle of the product, from cradle to grave. We have analysed the following phases; the production, the use phase and the end of life waste-treatment.



## Approach

In the LCA of 2018 we measured the indirect impact for two of our best-selling frames: Neil and Pierce. In our 2019 [LCA report](#) we have included the following variations in order to have an impact assessment of the variable styles in Ace & Tate's collection: Pierce regular (virgin) acetate, Pierce recycled acetate, Pierce bio acetate, Pierce Clip-on, Neil titanium and Neil stainless steel.

Acetate, metal and titanium are the materials at the core of our frames. Assessing all three product life cycles gives us the most complete picture.

### 1. Production

#### > Manufacturing

All frames within the scope of this report are manufactured in China.

#### > Edging & Mounting

Optical frames are shipped to either The Netherlands or Thailand for edging and mounting; the final wrapping with cloth and case happens in The Netherlands.

#### > Packaging

This happens any stage in process and can include consumer packaging or transport packaging.

#### > Transport

We dispatch the packaged frames either directly to consumers, or to our retail stores.

### 2. Use phase

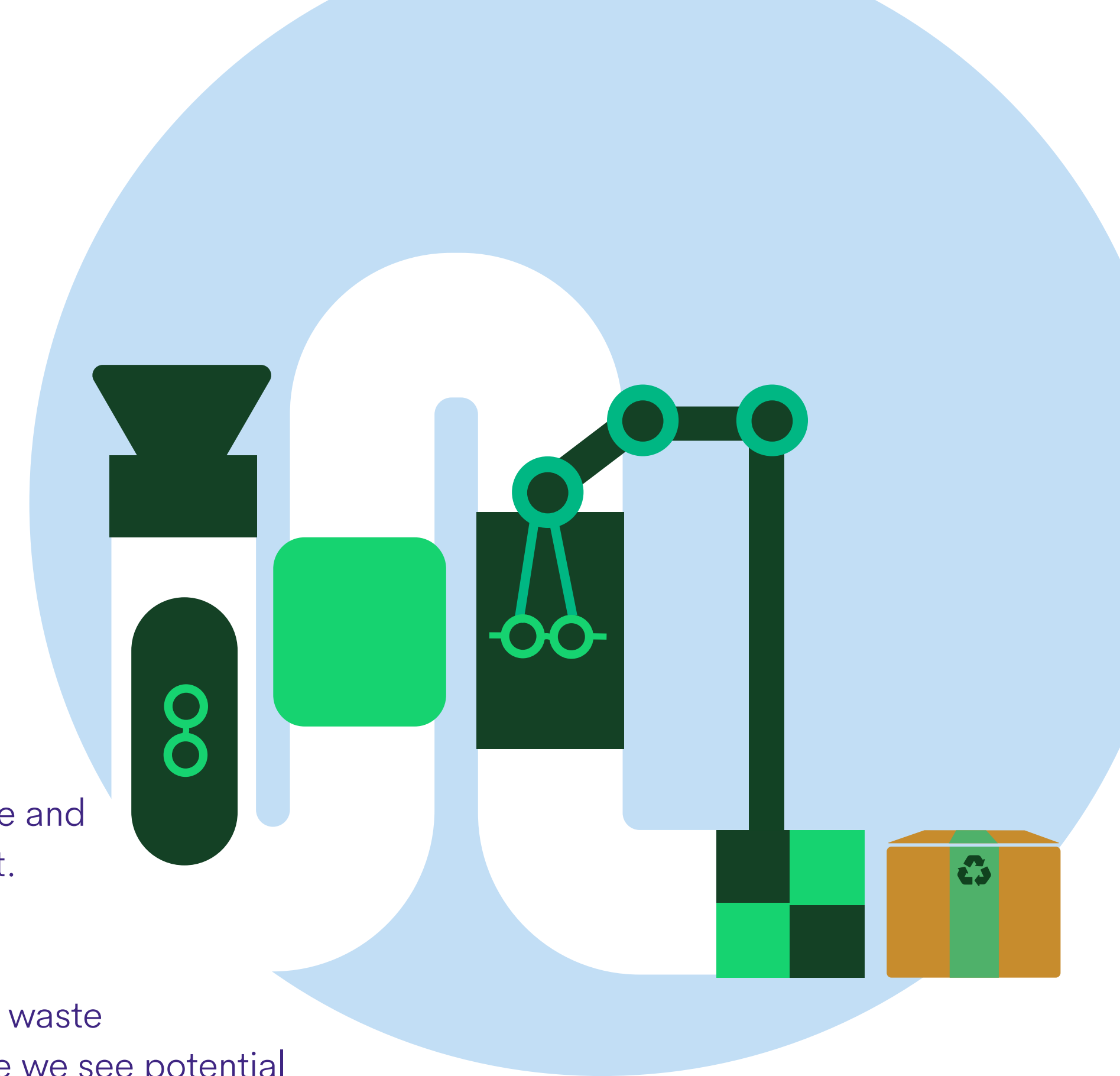
The use phase of our frames is based on a customer survey in which 296 respondents provided input on how a frame lasts and 301 respondents provided input on the frequency of cleaning with warm water and soap. These figures were used to assess the environmental impact related to cleaning a frame and thus the use phase of the product.

### 3. End-of-life

Finally, the impacts of production waste processing are included, because we see potential for being more resourceful there.

We know that currently 9% of all frames are returned to Ace & Tate. The returns are divided into the following categories:

1. Perfect condition: Cleaned and returned to shelves
2. Small defect: Refurbished and put in Reframe stock
3. Major defect: Stocked for recycling research





## Impact factors

We explained how the LCA results are presented in a common unit (CO<sub>2</sub>-eq.), but that does not tell you what else is assessed on our planet's behalf. After careful consideration, we landed on five impact factors that measure either an emission (what we cause) or rate of extraction (what we use). These categories are commonly used by other companies, making them relatable to our partners, our team, our customers and you, the reader:



CO<sub>2</sub> — equivalents, measuring the release of carbon dioxide emissions into the atmosphere (emission)



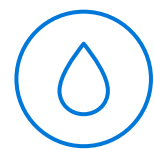
Toxicity — measuring the release of toxic emissions (emission)



Phosphate — the standard metric of eutrophication, measuring the impact on biological systems (emission)



Usage of non-renewable resources — such as oil, measuring how we impact resource scarcity for future generations (extraction)



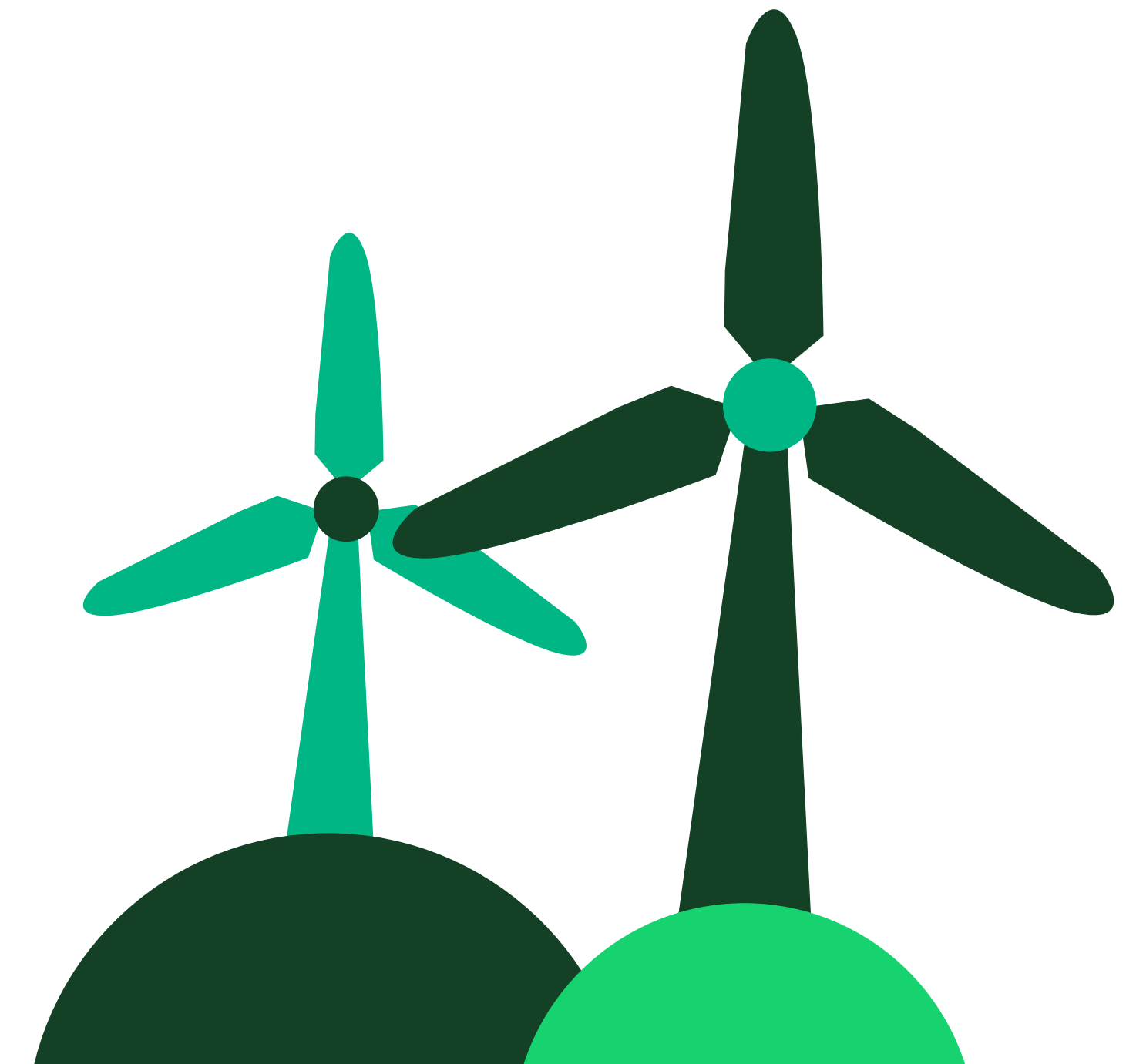
Water usage — measuring the impact on water scarcity (extraction)

## Data reliability

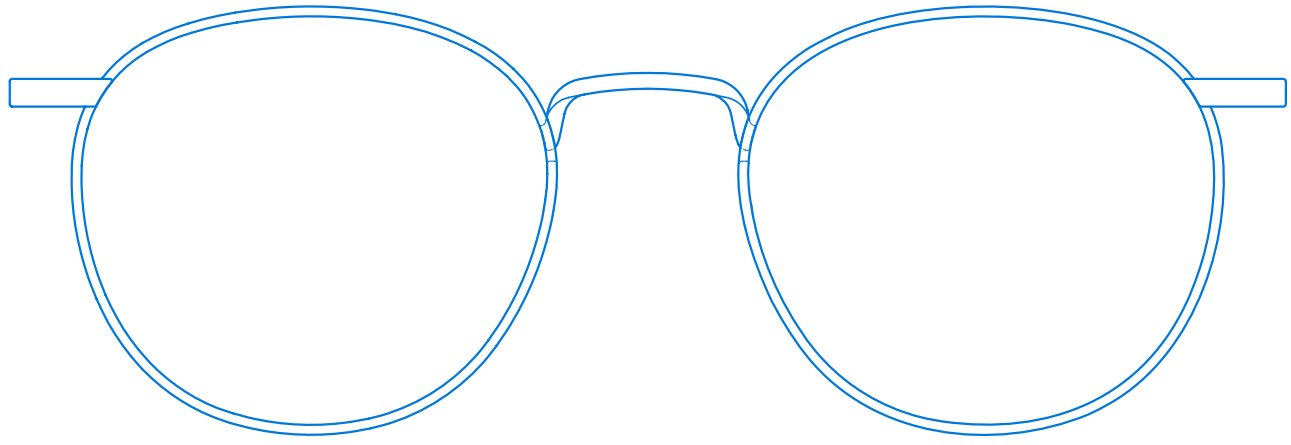
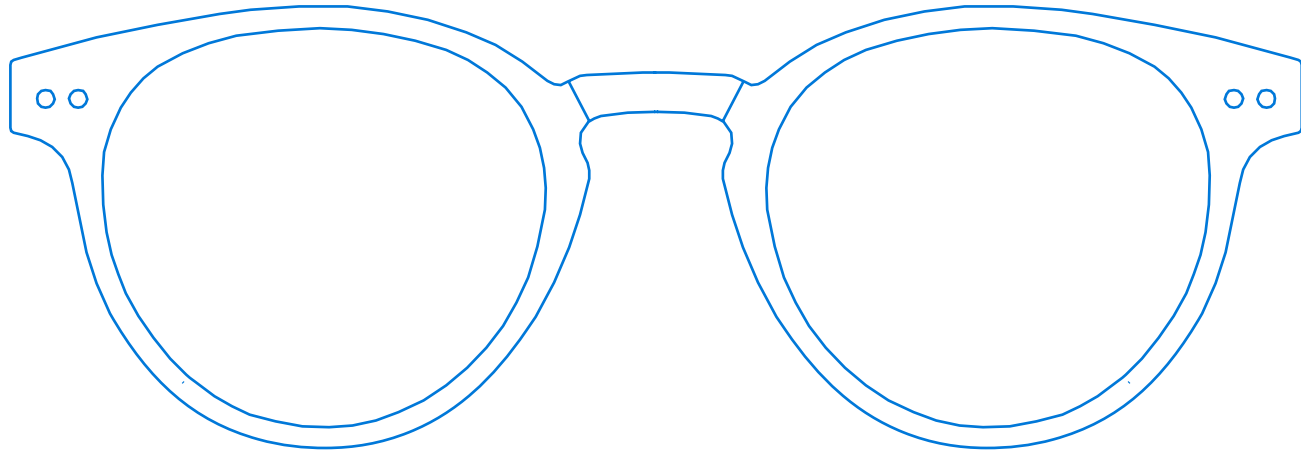
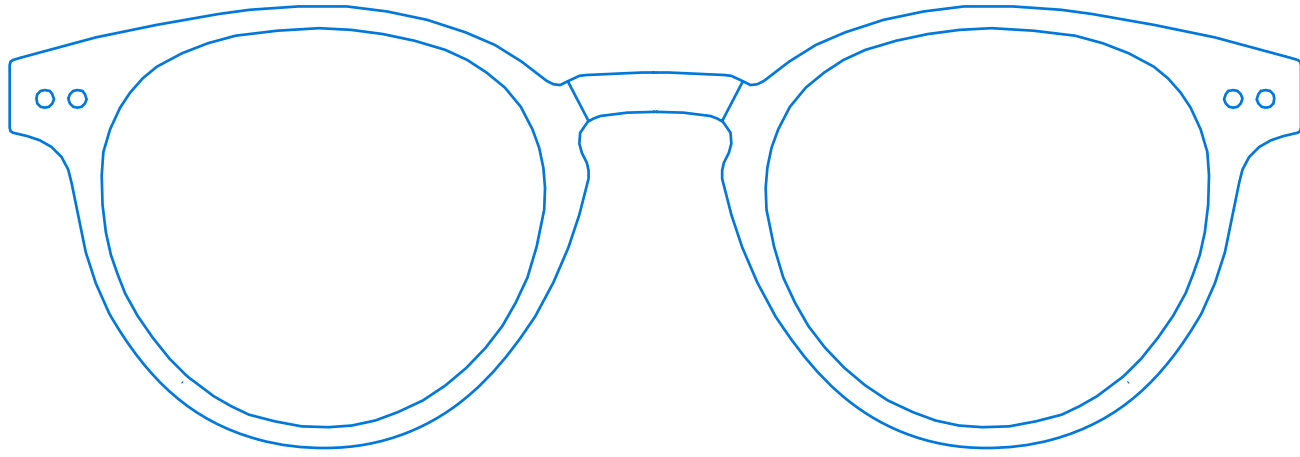
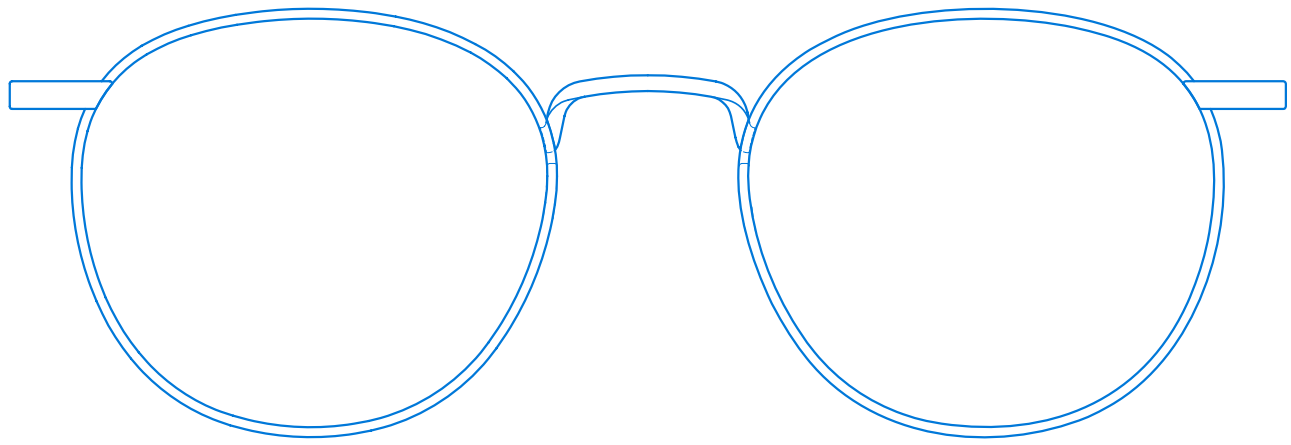
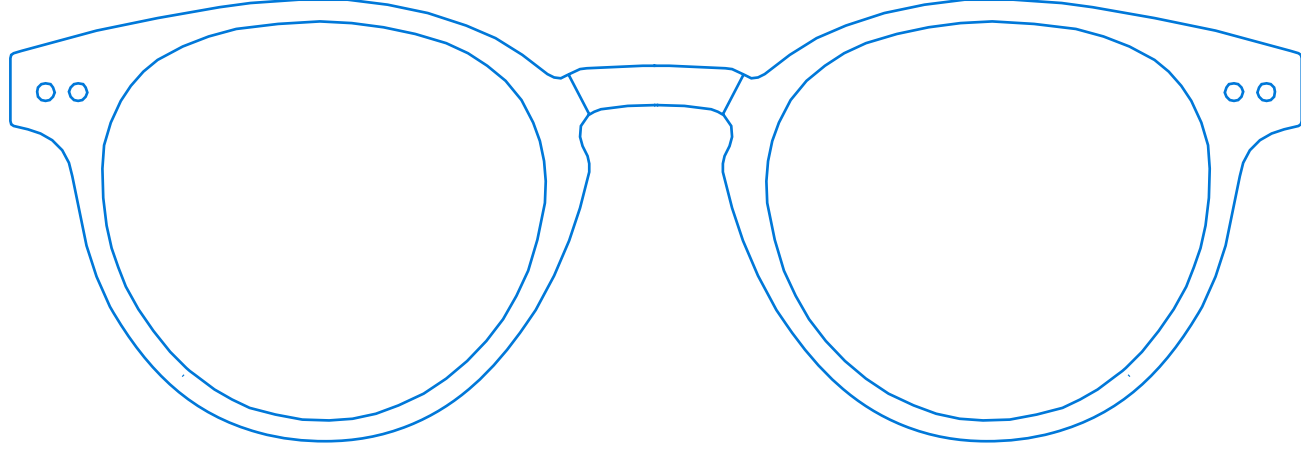
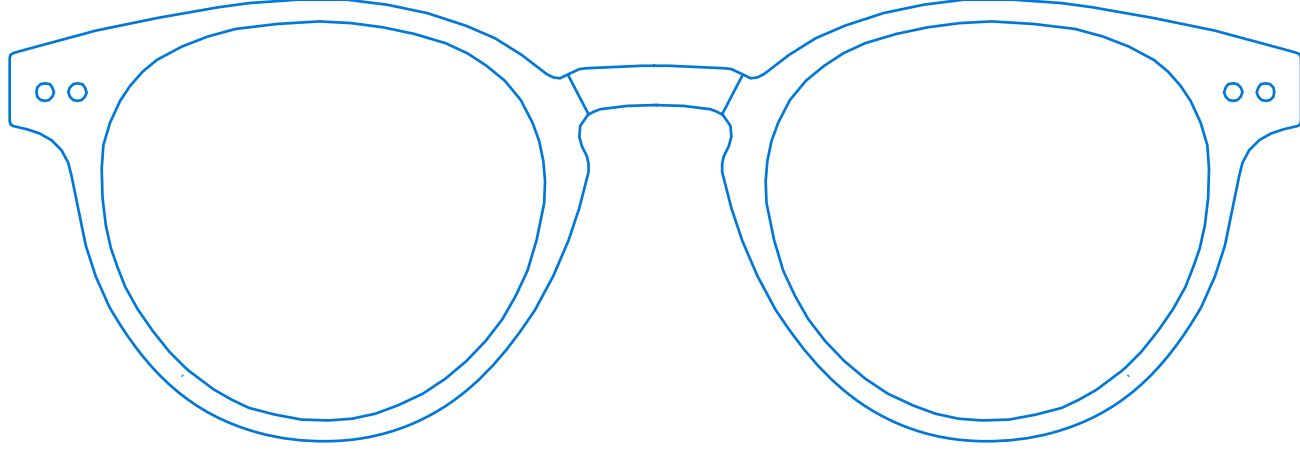
The quality of an LCA depends on the quality of its data. The harder we worked to find site-specific data, the more realistic our analysis.

The Supply Chain team chased our retail stores' landlords, and manufacturing partners for electricity gas invoices, the weight of materials and water bills. Some data remained unavailable.

We couldn't get exact numbers on the production of acetate slabs (i.e the plasticiser usage in the production of acetate slab). In such cases, Sustainalize uses industry benchmarks to complement our data.

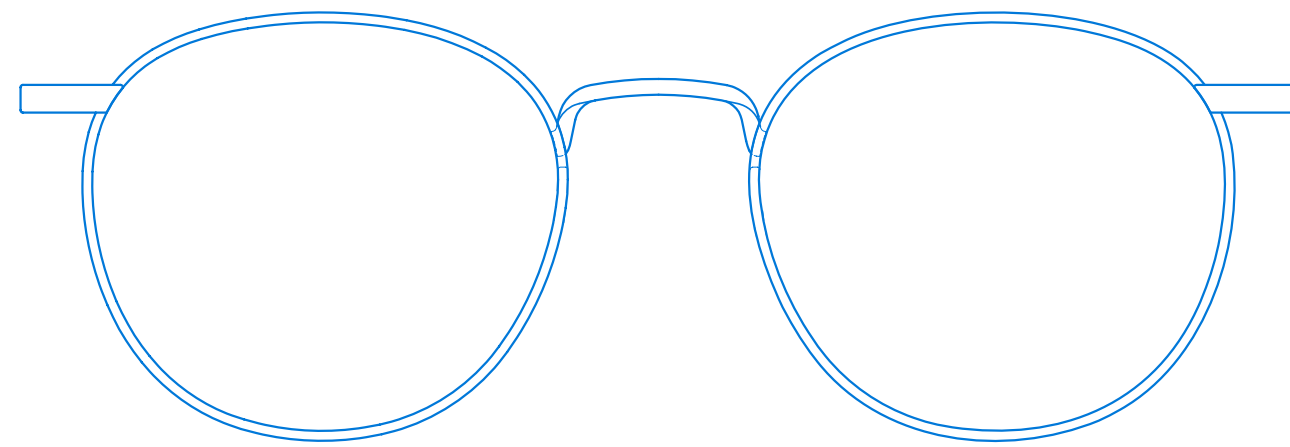


Below are pictured the Carbon Labels\* of each product group, which can also be communicated on the product page on the website.

Neil frames	Pierce frames	
 <p data-bbox="316 1037 469 1076"><b>Titanium</b></p> <p data-bbox="852 1037 1136 1076">4,01 kg CO<sub>2</sub> -eq</p>	 <p data-bbox="1246 1037 1492 1076"><b>Virgin acetate</b></p> <p data-bbox="1775 1037 2059 1076">4,66 kg CO<sub>2</sub> -eq</p>	 <p data-bbox="2142 1037 2445 1076"><b>Recycled acetate</b></p> <p data-bbox="2675 1037 2958 1076">4,29 kg CO<sub>2</sub> -eq</p>
 <p data-bbox="316 1596 569 1635"><b>Stainless steel</b></p> <p data-bbox="852 1596 1136 1635">3,93 kg CO<sub>2</sub> -eq</p>	 <p data-bbox="1246 1596 1446 1635"><b>Bio acetate</b></p> <p data-bbox="1775 1596 2059 1635">4,62 kg CO<sub>2</sub> -eq</p>	 <p data-bbox="2142 1596 2392 1635"><b>Pierce clip-on</b></p> <p data-bbox="2675 1596 2958 1635">2,04 kg CO<sub>2</sub> -eq</p>

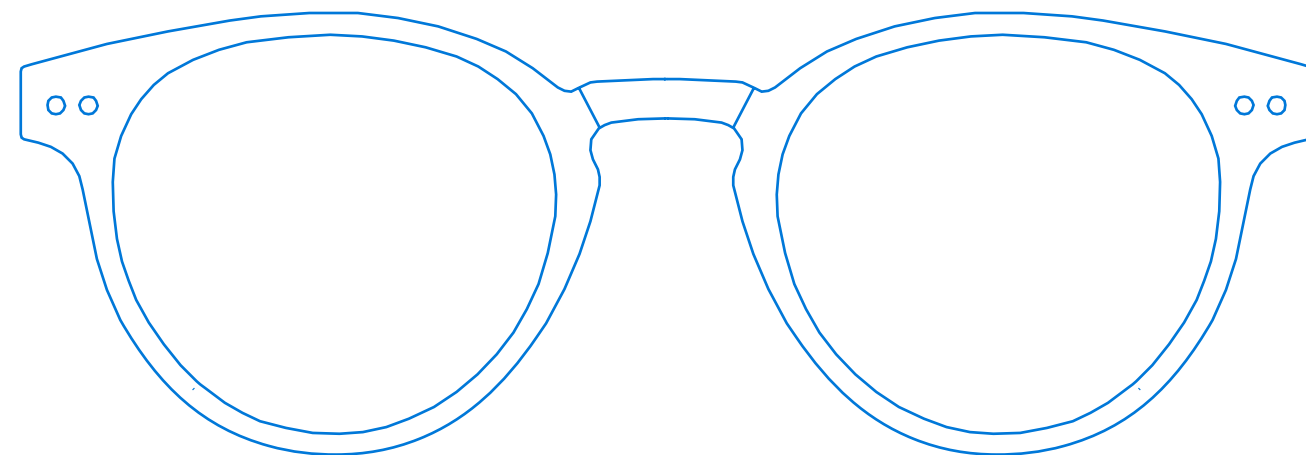
\* These are displayed excluding the 1,1 kg Co<sub>2</sub> -eq. emitted during use phase.

Comparing the frames



> **Neil**

Through the LCA, we learned that the production of a Neil stainless steel frame has a total impact of 5,03 kg CO2-eq. (Compared to 3,65 kg CO -eq in 2018).



> **Pierce**

Producing a Pierce (acetate) frame comes to 5,76 kg CO2-eq. (Compared to 6,88 kg CO -eq in 2018).

The production of acetate frames has a higher impact than that of metal as acetate requires more processing to cometo its final shape.

Important to note is that the Scope has changed in 2019, as we've included the use phase. The use phase (i.e cleaning the product with warm water) accounts for 1,1 kg CO2-eq during the lifetime of a frame.

(In kg Co2 -eq.)	2017 Baseline	2018	2019 (excl. use phase)	2019 (incl. use phase)	% Difference 2018 • 2019 (excl. use phase)
<b>Neil Titanium</b>			4,01	5,11	
<b>Neil Stainless steel</b>	4,36	3,65	3,93	5,03	8%
<b>Pierce Virgin acetate</b>	7,47	6,88	4,66	5,76	32%
<b>Pierce Recycled acetate</b>			4,29	5,39	
<b>Pierce Bio acetate</b>			4,62	5,72	
<b>Pierce Clip-on</b>			2,04	3,14	

**NB:** The table above shows the difference in kg Co2 -eq. per frame.

So where is the impact? Detailed in the following tables is the exact impact of the frames in the different phases in the Life Cycle, measured in kg Co<sub>2</sub> -eq.



Pierce Regular Acetate	2018 kg Co2 -eq	2019 kg Co2 -eq		Percentage difference
Raw materials	0,444	0,400		
Demo/plano lens	0,101	0,141		
Packaging	0,015	0,018		
Transport to brand eyewear	0,001	0,003		
Production of frame	3,224	● 1,060	The utilities usage in China is significantly better compared to 2019	
CR39 optical lens	0,193	0,163		
Transport lens and frame	0,447	● 0,209	Decreased due to optimisation related to flights.	<b>Production phase -34%</b>
ENOT/HOYA	0,836	● 0,960	The overall impact for edging increased slightly, due to better data from ENOT.	
Transport frame	0,052	● 0,048		
Packaging + Transport	0,537	● 0,726	An increase related to a different composition of the case (water-based poly-urethane has a higher impact per kg CO2 than paper/PET).	
Docdata	0,111	0,146		
Retail	0,006	0,010		
Transport to Client/Retail	0,771	● 0,561	Decreased due to optimisation in green energy usage.	The use phase adds 1,1kg CO2-eq. This is +/- 30% of the overall impact.
Use phase	N/A	1,104	Compared to 2019, Ace & Tate increased the scope by adding the use phase. This impacted overall results significantly. The use phase adds 1,1kg CO2-eq. This is +/- 30% of the overall impact	<b>End of life 48%</b>
End of life	0,143	● 0,212	An increase related to a different composition of the case (water-based poly-urethane has a higher impact per kg CO2 than paper/PET).	

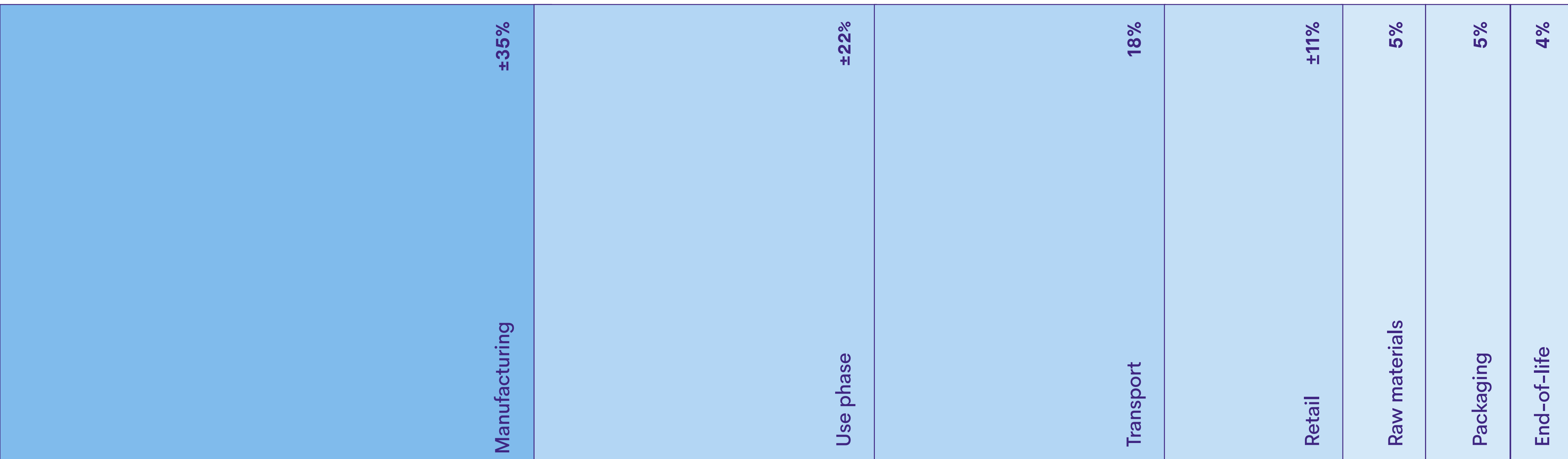
Neil Stainless steel	2018 kg Co2 -eq	2019 kg Co2 -eq		Percentage difference
Raw materials	0,212	0,202		
Demo/plano lens	0,101	0,109		
Packaging	0,015	0,015		
Transport to brand eyewear	0,000	0,001		
Production of frame	0,583	0,559		
CR39 optical lens	0,204	0,180		
Transport lens and frame	0,534	● 0,213	Decreased due to optimisation related to flights.	Production phase -6%
ENOT/HOYA	0,836	● 0,96	The overall impact for edging increased slightly, due to better data from ENOT.	
Transport frame	0,063	0,049		
Packaging + Transport	0,537	● 0,726	An increase related to a different composition of the case (water-based polyurethane has a higher impact per kg CO2 than paper/PET).	
Docdata	0,111	0,146		
Retail	0,006	0,010		
Transport to Client/Retail	0,771	● 0,561	Decreased due to optimisation in green energy usage.	The use phase adds 1,1kg CO2-eq. This is +/- 30% of the overall impact.
Use phase	N/A	1,104	Compared to 2019, Ace & Tate increased the scope by adding the use phase. This impacted overall results significantly. The use phase adds 1,1kg CO2-eq. This is +/- 30% of the overall impact	End of life phase 38%
End of life	0,143	● 0,197	An increase related to a different composition of the case (water-based poly-urethane has a higher impact per kg CO2 than paper/PET).	

## LCA value chain impact

The diagram shows the distribution of GHG emissions for an average frame, through its lifecycle. Including use phase.

Also the Use phase has a relatively high impact, mostly due to customers using warm water to clean their glasses.

Production of the frames is relatively high impact, mostly due to the energy efficiency at our manufacturers. With this information, we can take steps that enable more edging and mounting in stores, which would reduce emissions for this phase.



# Conclusion



**Conclusion total impact**

When it comes to achieving targets, we need to understand which measures can be taken and what the potential impact is per measure.

To get to a starting point we will use the 'circle of impact' in the graph on the right. The circle depicts the total overall impact per scope and impact driver. Described below are the biggest impact drivers.

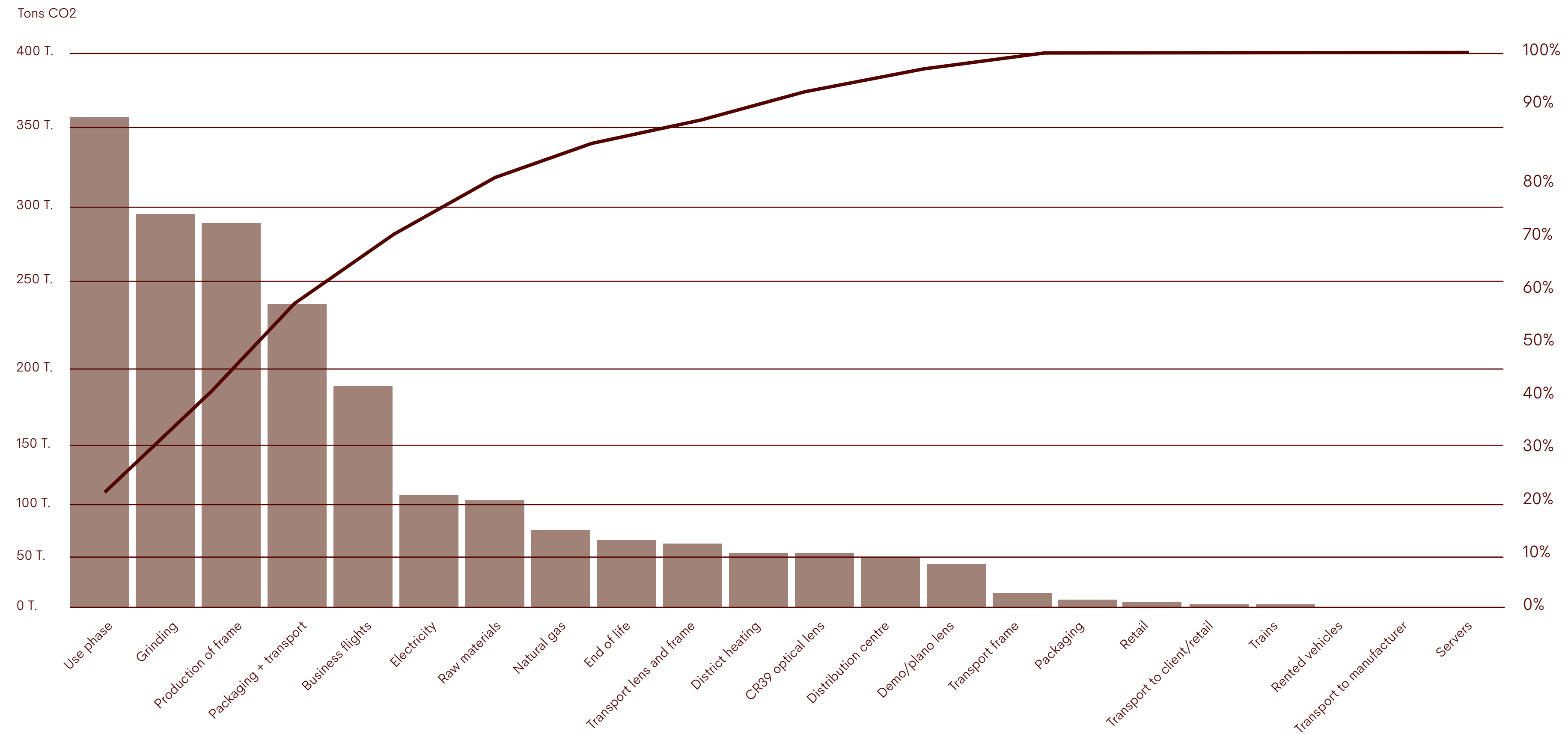
Use phase	<b>18%</b>	The main driver is natural gas usage to heat water for lukewarm water to clean
Grinding	<b>15%</b>	The main driver is energy usage by production facility
Frame production	<b>14%</b>	The main driver is energy usage by production facility
Packaging and Transport	<b>11%</b>	The main driver is raw material for packaging
Raw materials	<b>5%</b>	The main driver is raw materials for frames (metal, acetate & DEP)
Business flights	<b>9%</b>	
Electricity usage	<b>6%</b>	

Combined the items above represent **78% of total emissions.**



## Conclusion total impact

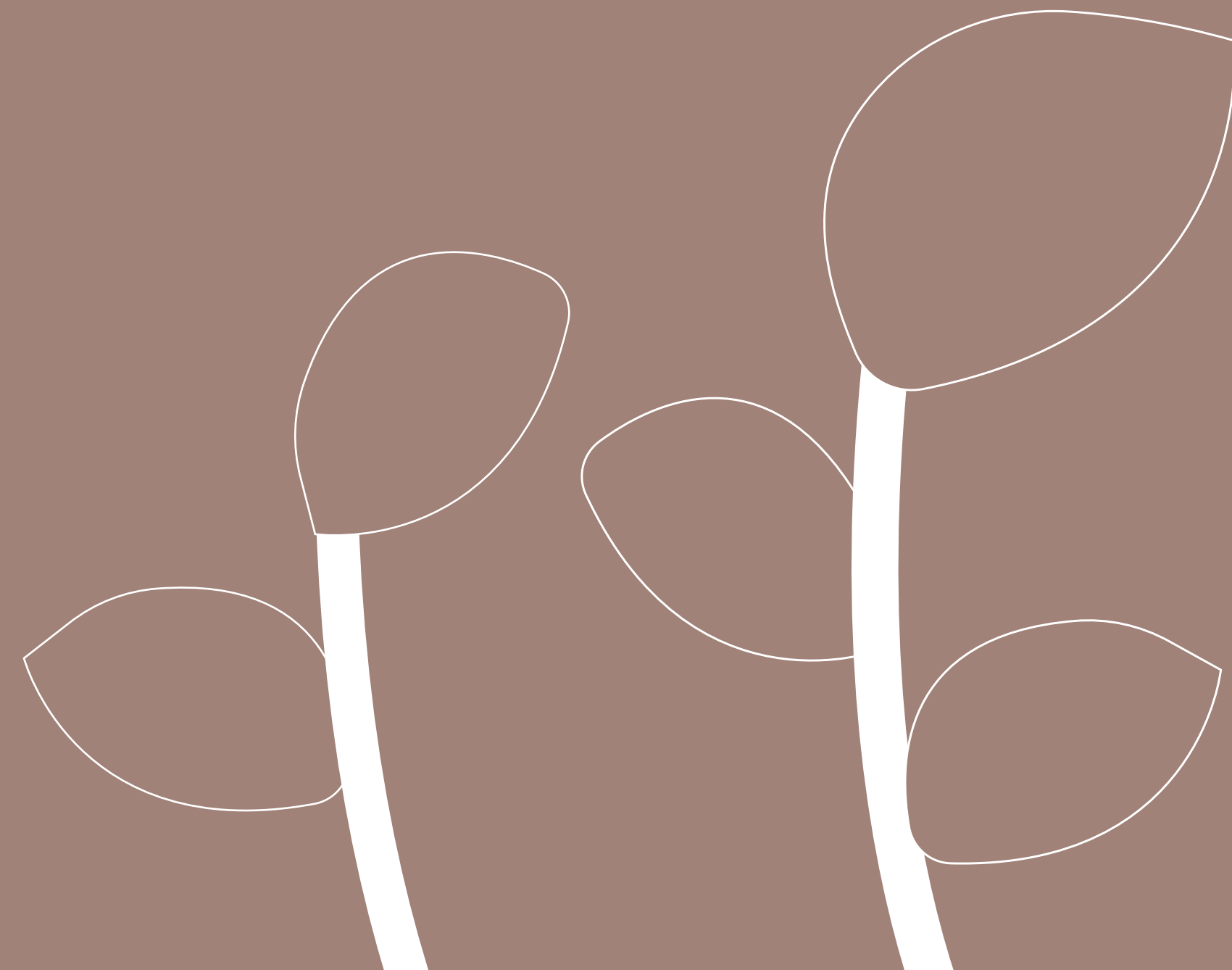
The most impactful drivers pictured below, form the basis of our 2021 and 2030 goals, taking full responsibility of all stages of our value chain, direct and indirect impact.



# Responsibility is a marathon, not a sprint.

For question regarding our  
environmental responsibility  
efforts, please contact:

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