



CARBON FOOTPRINT REPORT

Carbon footprints of Willicroft's products
March 2024

narrate.
impact in numbers and stories

INTRODUCTION

Willicroft is a plant-based cheese and butter company in Amsterdam. The name Willicroft originates from the Willicroft Farm in Devon which our founder's (Brad) grandparents farmed and ran for 50 years. Upon moving to Amsterdam in 2018, Brad started eating a plant-based diet but struggled to give up cheese. Applying traditional cheese-making processes, Willicroft in its reimaged form was born.

In 2020, we made Mother Nature our CEO to ensure nature was placed at the centre of everything we do. In 2022, we became the 1st European plant-based cheese B Corp and remain the highest scoring cheese or butter B Corp globally. Impact starts with measurement. This report lays out the carbon emission numbers of our products and how we can improve moving forward.

We calculated the equivalent carbon emissions of our products per kilogram of product (our carbon footprint in X kg CO₂-eq per kilogram of product) based on established LCA methodology from cradle to grave. Our calculations include the agricultural processes, production, packaging, transportation, and end-of-life for packaging.

~95% of the processes, flows and elements in our calculations (inventory analysis in LCA terms) are based on supplier specific data: directly sourced from our suppliers ensuring the most recent and highest possible data accuracy. All other components are based on industry specific data sourced from CarbonCloud, academic articles, and reports from (non-)dairy alternative products. An additional 4% margin per product is added to account for uncertainties, discrepancies or errors in data collection. Original Better has a higher uncertainty margin (6%) due to less supplier specific data and more assumptions for its transportation.

1. PRODUCT SPECIFIC DETAILS

This chapter provides an overview of the product from cradle to grave, meaning from raw materials to the product's end-of-life. The tables show each product's emissions in kg CO₂-equivalent per kilogram of product and the percentage contribution of each process step to its total emissions.

- **Raw materials** → refer to both the agricultural production of our ingredients and the transportation of these ingredients.
- **Production** → all production steps at our producer's factories, including storage units, production machines, packaging machines, and fridges.
- **Packaging** → all materials used for the packaging of the products, ranging from batch packaging to brand packaging.
- **Transportation** → all transportation that is not yet included in previous steps. These include the distribution of finished goods from our producers to our customers and our final consumers.
- **Use** → this phase considers the use of our product by our consumers. This phase has not been calculated yet.
- **End of life** → refers to the waste treatment of a product's packaging, encompassing both the end of life of our batch packaging and that of our brand packaging.
- **Uncertainty** → as data may change or data might not be as specific as we would like, an uncertainty percentage is added to cover small uncertainties within our data.
- **Others** → all remaining components of the product's lifecycle.

ORIGINAL BETTER

2.48 KG CO2-EQ
per kg of product

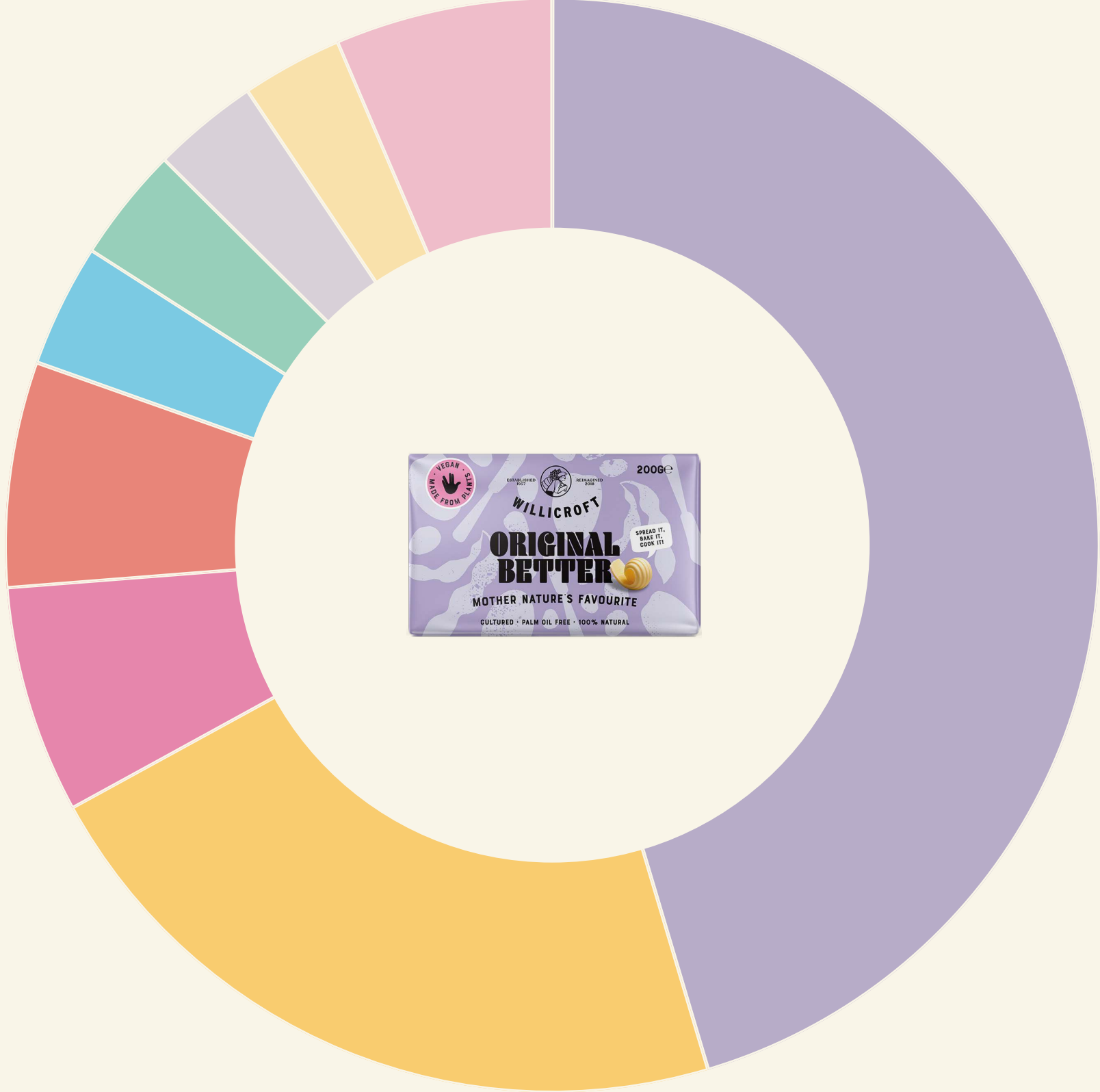


PROCESS	EMISSIONS KG CO2-EQ	%
Raw materials	1,97	79,51%
Production	0,04	1,73%
Packaging	0,12	4,91%
Transportation	0,12	4,96%
Use	-	-
End of Life	0,08	3,23%
<i>Uncertainty (6%)</i>	<i>0,14</i>	<i>5,66%</i>
Total	2,48	100%



ORIGINAL BETTER

- **Shea butter oil** is the largest contributor to the total emissions of the Original Better, accounting for almost half of the total emissions (~46%).
- **Coconut oil** is responsible for ~22% of the product's emission
- **Rapeseed oil** and our precise **fermented soybean extract** together account for 13% of total emissions.



Shea butter oil 45,39%	Emulsifier 3,63%	Others 6,42%
Coconut oil 21,63%	Foil (PE Plastic) 3,4%	
Fermented soybean extract 6,74%	Post-used disposal waste foil 3,15%	
Rapeseed oil 6,66%	Small lorry transport 2,99%	

YOUNG DUTCH

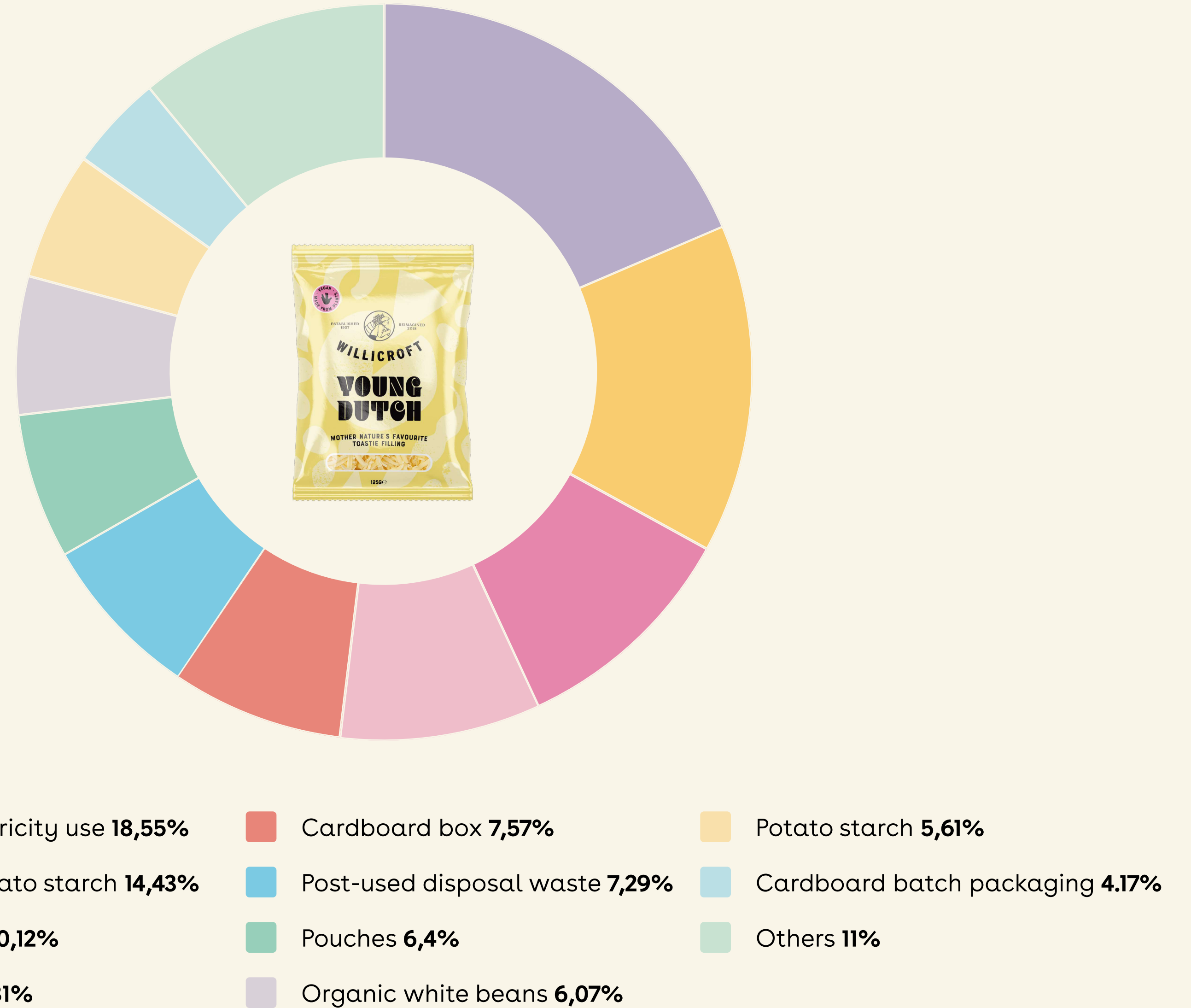


1.56 KG CO2-EQ
per kg of product

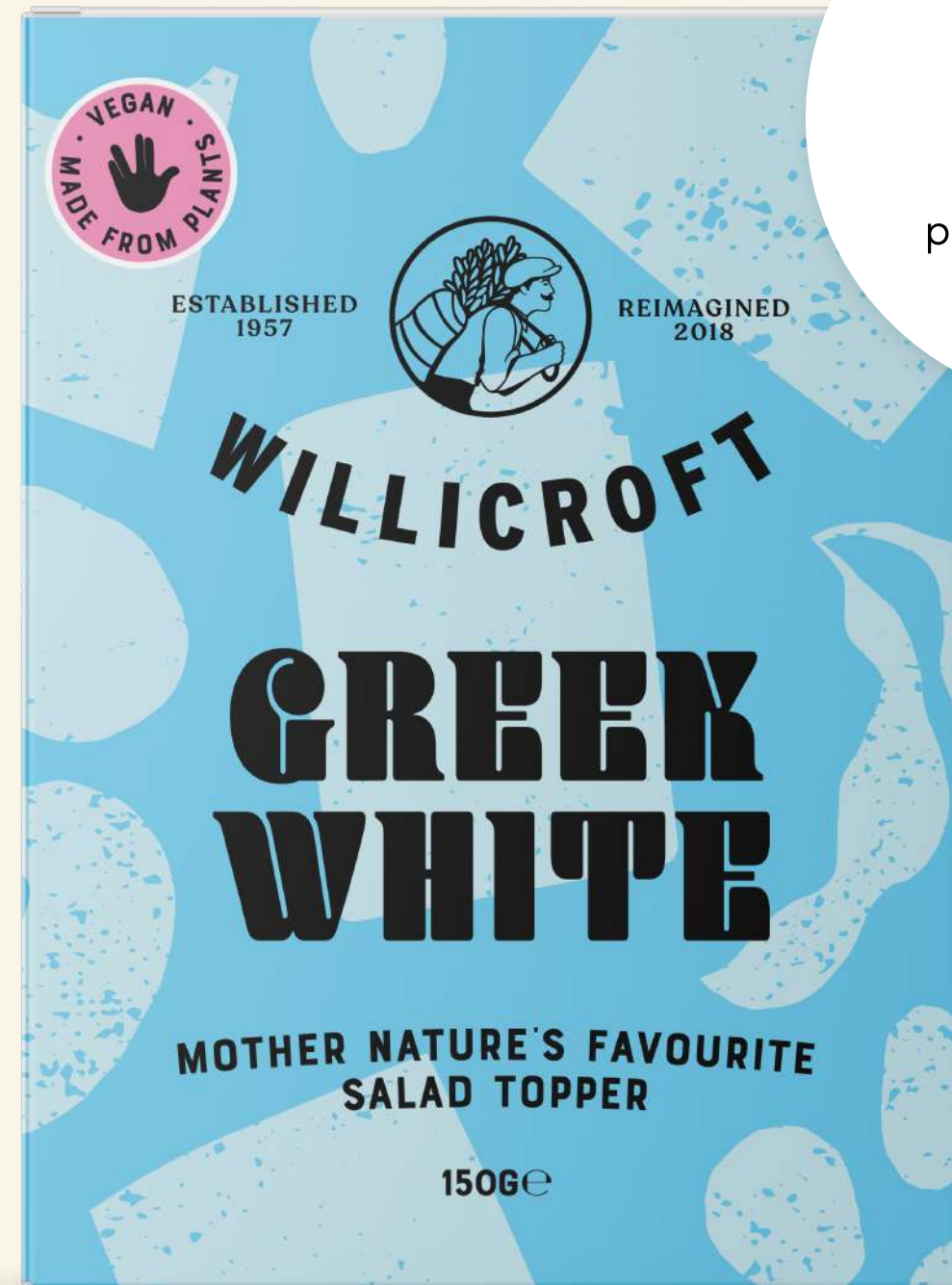
PROCESS	EMISSIONS KG CO2-EQ	%
Raw materials	0,62	39,67%
Production	0,32	20,42%
Packaging	0,29	18,80%
Transportation	0,13	8,47%
Use	-	-
End of Life	0,14	8,79%
<i>Uncertainty (4%)</i>	<i>0,06</i>	<i>3,85%</i>
Total	1,56	100%

YOUNG DUTCH

- **Electricity use** from one of our suppliers accounts for almost one fifth (19%) of the products total emissions - making that supplier responsible for 88% of total supplier electricity use for this product.
- A **potato-derived ingredient** accounts for ~14% of the Young Dutch's total emissions.
- **Coconut oil** accounts for just over 10% of total emissions.
- **The pouches** (brand packaging) are shipped in cardboard boxes, accounting for almost 8% of total product emissions.



GREEK WHITE



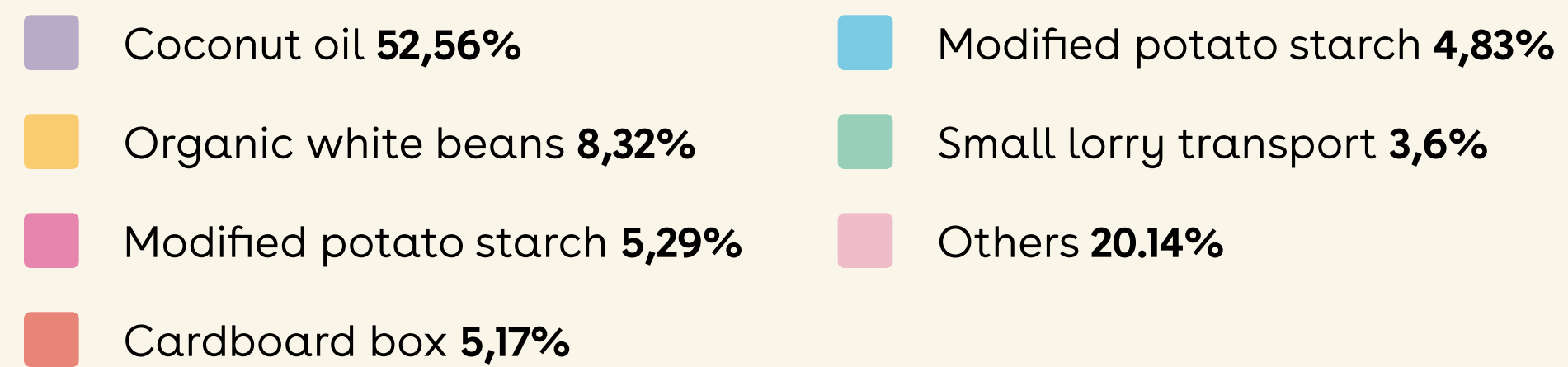
1.26 KG CO2-EQ
per kg of product

PROCESS	EMISSIONS KG CO2-EQ	%
Raw materials	0,99	78,32%
Production	0,04	3,36%
Packaging	0,08	6,67%
Transportation	0,07	5,32%
Use	-	-
End of Life	0,03	2,48%
<i>Uncertainty (4%)</i>	<i>0,05</i>	<i>3,85%</i>
Total	1,26	100%



GREEK WHITE

- The **coconut oil** accounts for 52,56% of the products emissions, making it the largest contributor for this product.
- The **white beans** together account for ~8% of the product's total emissions.



ITALIAN AGED



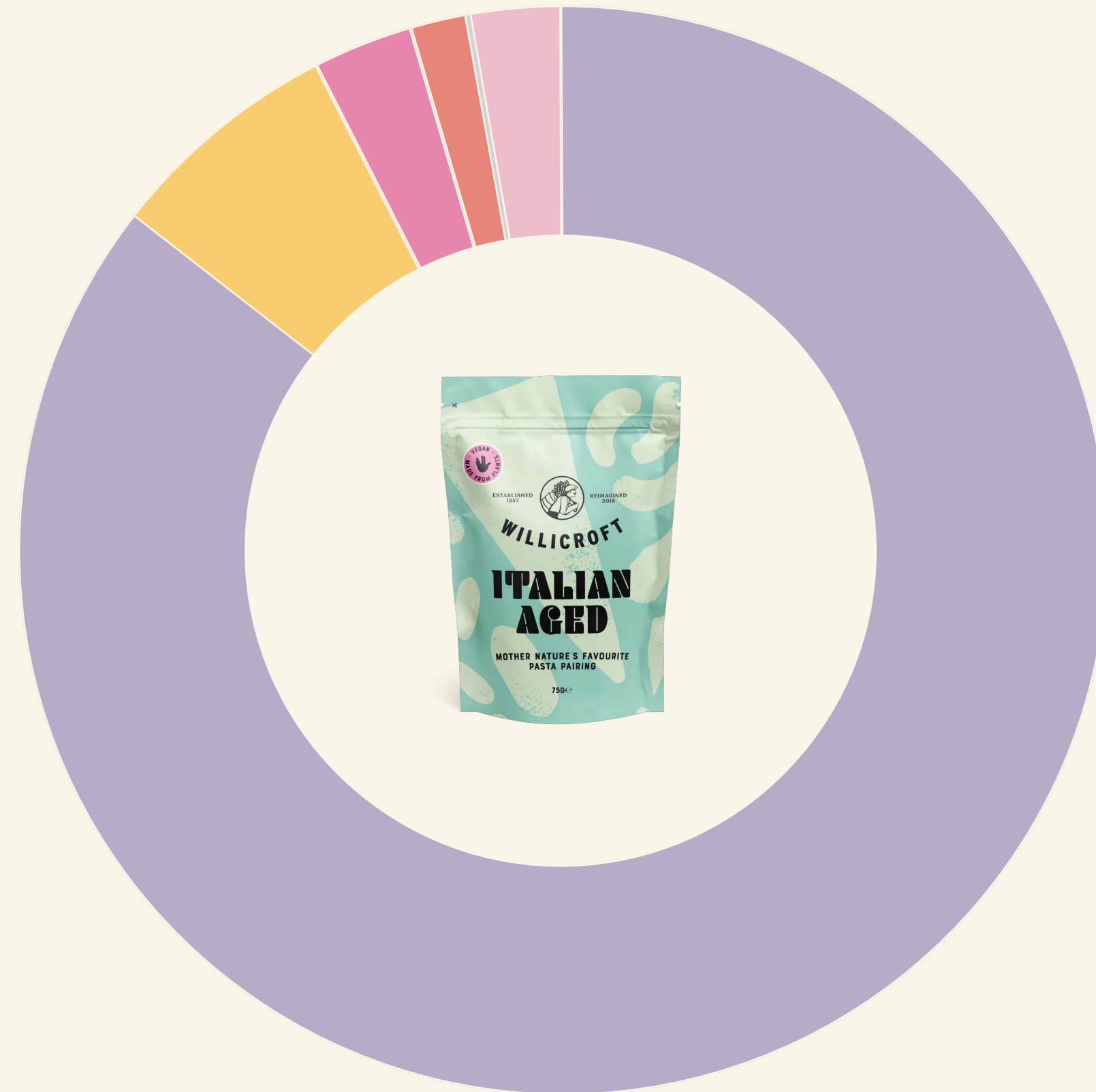
**7.99 KG
CO2-EQ**
per kg of product

PROCESS	EMISSIONS KG CO2-EQ	%
Raw materials	7,38	92,41%
Production	0,01	0,07%
Packaging	0,01	0,12%
Transportation	0,06	0,70%
Use	-	-
End of Life	0,23	2,86%
<i>Uncertainty (4%)</i>	<i>0,31</i>	<i>3,85%</i>
Total	7,99	100%



ITALIAN AGED

- ~86% of the product's total emissions are caused by the **cashews** as primary ingredient.
- The **nutritional yeast** accounts for 7% of the product's total GHG emissions.



Cashew **85,99%**

Nutritional yeast **6,98%**

Waste packaging pouches post-used **2,69%**

Corn starch **1,66%**

Waste packaging cardboard post-used **0,29%**

Others **2,69%**

ORIGINAL FONDUE

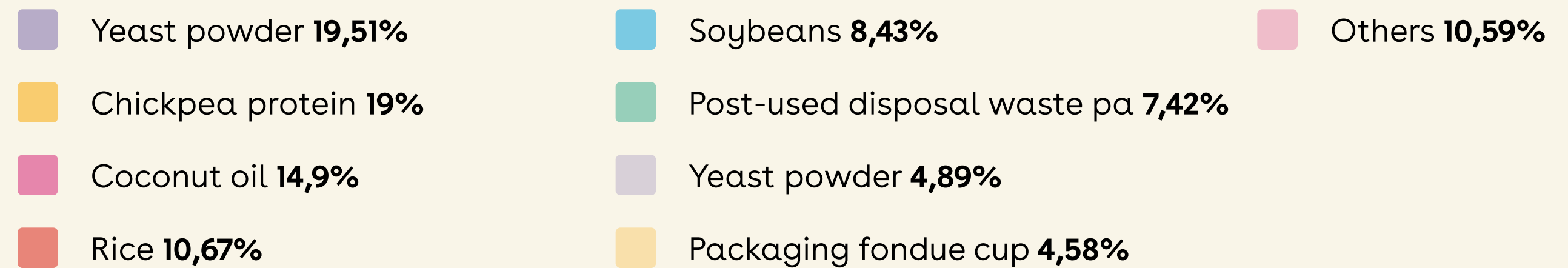


**2.24 KG
CO2-EQ**
per kg of product

PROCESS	EMISSIONS KG CO2-EQ	%
Raw materials	1,72	76,73%
Production	0,07	3,01%
Packaging	0,14	6,36%
Transportation	0,03	1,45%
Use	-	-
End of Life	0,19	8,60%
<i>Uncertainty (4%)</i>	<i>0,09</i>	<i>3,85%</i>
Total	2,24	100%

ORIGINAL FONDUE



- The highest contributor to the total emissions of the Fondue is **yeast powder**, accounting for ~20% of the total emissions
- The **chickpea protein** accounts for 19% of the total emissions
- The **coconut oil** accounts for ~15% of the fondue's total emissions



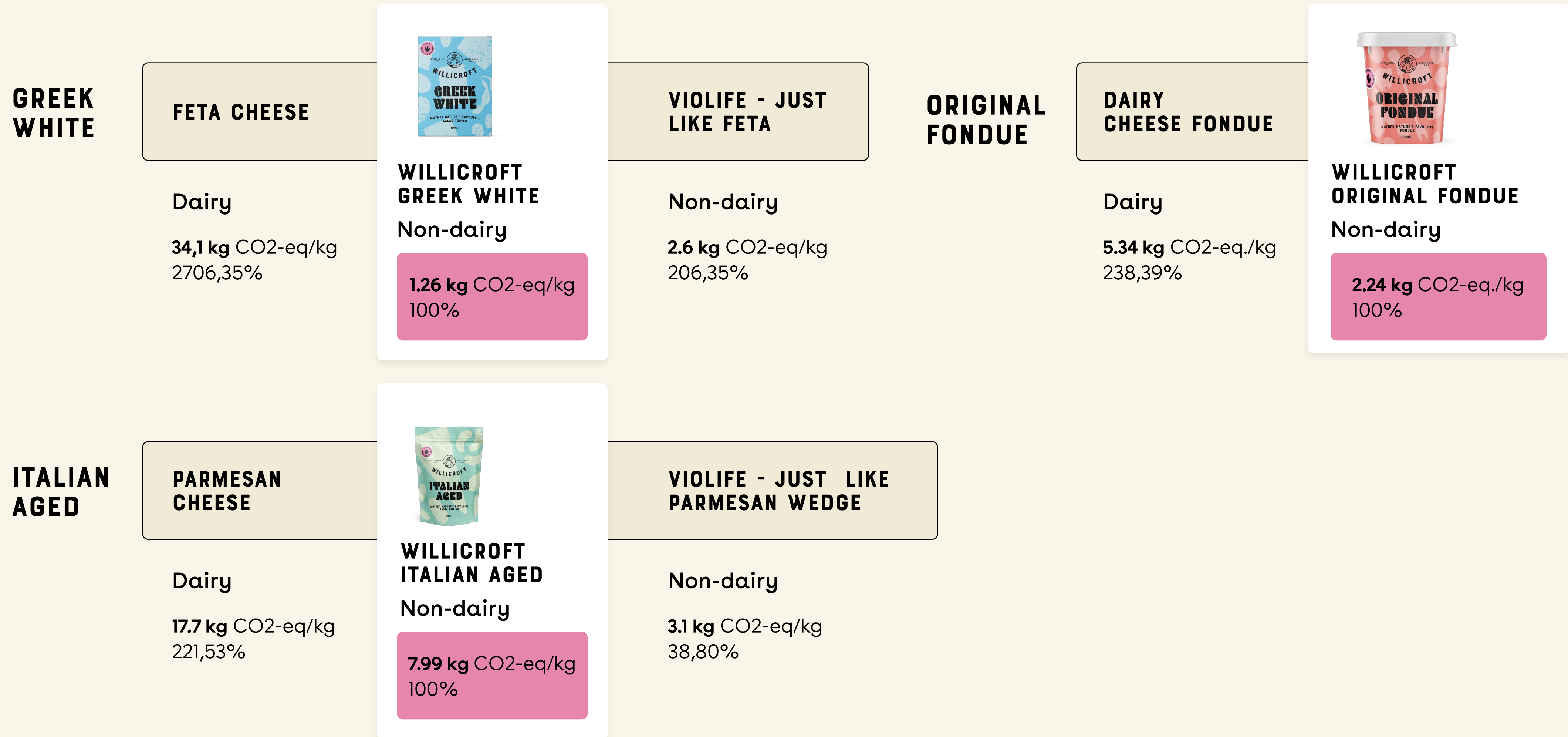
2. DAIRY AND NON-DAIRY COMPARISONS

Willicroft is on a mission to reduce its environmental impact and uses retrospective and prospective data analyses to support decision-making. Not only are we trying to reduce our emissions, we also strive to have the tastiest and lowest-impact products. Benchmarking against comparable (non-)dairy products enables us to demonstrate the benefit we serve our customers and the end consumer. We selected the following brands for comparison because they closely resemble the Willicroft alternatives, are close competitors, and hold prestigious positions in the supermarket aisles.

Chapter 2. Dairy and non-dairy comparisons

ORIGINAL BETTER	BUTTER /MARGARINE		AN UPFIELD ALTERNATIVE	NATURLI ORGANIC SPREAD	UPFIELD GENERAL RESEARCH
	Dairy 16,9 kg CO2-eq/kg 681,45%	WILLICROFT ORIGINAL BETTER Non-dairy 2,48 kg CO2-eq/kg 100%	Non-dairy 3,67 kg CO2-eq/kg 147,98%	Non-dairy 2,47 kg CO2-eq/kg 99,6%	Non-dairy 3,24 kg CO2-eq/kg 130,65%
YOUNG DUTCH	GOUDA CHEESE		VIOLIFE CHEDDAR GRATED		
	Dairy 12,6 kg CO2-eq/kg 807,69%	WILLICROFT YOUNG DUTCH Non-dairy 2,48 kg CO2-eq/kg 100%	Non-dairy 2,6 kg CO2-eq/kg 166,67%		

Chapter 2. Dairy and non-dairy comparisons



3. SOURCES & REFERENCES

SOURCING

Our data has been gathered directly from our suppliers to calculate our products' emissions. We used reference/competitor and industry averages to complement any missing data that we couldn't collect from our suppliers. We also sourced data from scientific journals and reverse engineered some of our products life cycle outputs; meaning that we retrieved some data by breaking down the final product. By using Mobius (by Ecochain) to build our LCAs in one software tool, we were able to reference data from Ecoinvent. Any references that were missing in the Ecoinvent database were complemented with data from our primary source CarbonCloud. CarbonCloud was chosen as our main data source as it is updated regularly, makes it more reliable than scientific research or other sources that can become outdated quickly.



SOURCES ORIGINAL BETTER

1. (2024, March 20) <https://apps.carboncloud.com/climatehub/product-reports/id/116838100638>
2. (2024, March 20) 2x Based on a 70% reduction (as mentioned in [Upfield's 2021 ESG Report, page 7](#)) of the dairy butter emissions in the Netherlands (12.23 kg CO₂-eq/kg) as mentioned in [Quantis' 2020 Life Cycle Assessment Technical Summary of Upfield plant-based spreads and margarine vs. dairy butter, page 5](#)).
3. (2024, March 20) <https://apps.carboncloud.com/climatehub/product-reports/id/39073935134>
4. (2024, March 20) https://www.upfield.com/-/media/Project/Upfield/Corporate/Upfield%20Corporate/Supplier%20centre/PDFs/Upfield_TechnicalSummary_2020-03-09_Quantis.pdf (page 5)

SOURCES YOUNG DUTCH

1. (2024, March 20) <https://apps.carboncloud.com/climatehub/product-reports/id/184050385132>
2. (2024, March 20) <https://www.violife.com/en-us/-/media/Project/Upfield/Brands/Violife-Foods/Violife-Foods-US-New/Assets/About-Us/upfield-violife-technicalsummary-quantis-april2022.pdf?rev=7a8df5b1db044d6c9fbb67b16b22af09>

SOURCES GREEK WHITE

1. (2024, March 20) <https://apps.carboncloud.com/climatehub/product-reports/id/153545856394>
2. (2024, March 20) <https://www.violife.com/en-us/-/media/Project/Upfield/Brands/Violife-Foods/Violife-Foods-US-New/Assets/About-Us/upfield-violife-technicalsummary-quantis-april2022.pdf?rev=7a8df5b1db044d6c9fbb67b16b22af09>

SOURCES ITALIAN AGED

1. (2024, March 20) <https://apps.carboncloud.com/climatehub/product-reports/id/477200824828>

SOURCES ORIGINAL FONDUE

1. (2024, March 20) <https://www.violife.com/en-us/-/media/Project/Upfield/Brands/Violife-Foods/Violife-Foods-US-New/Assets/About-Us/upfield-violife-technicalsummary-quantis-april2022.pdf?rev=7a8df5b1db044d6c9fbb67b16b22af09>

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<https://apps.carboncloud.com/climatehub/product-reports/id/153545856394>

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“Quantis. (2020). Upfield plant-based spreads and margarine vs. dairy butter: Life Cycle Assessment Technical Summary. In Upfield. Retrieved March 20, 2024 from: https://www.upfield.com/-/media/Project/Upfield/Corporate/Upfield%20Corporate/Supplier%20centre/PDFs/Upfield_TechnicalSummary_2020-03-09_Quantis.pdf”

“Quist, A. Z. (2024). Life Cycle Assessment (LCA) - Complete beginner’s guide. Ecochain. Retrieved March 20, 2024 from: <https://ecochain.com/blog/life-cycleassessment-lca-guide/>”

Soft cheese. (n.d.). CarbonCloud. Retrieved March 20, 2024, from: <https://apps.carboncloud.com/climatehub/product-reports/id/184050385132>

Violife 100% vegan alternative to cheese vs. dairy cheese in Europe, UK, US, Canada and Japan.: Life Cycle Assessment Technical Summary. (2022, April). Violife. Retrieved March 20, 2024, from: <https://www.violife.com/en-us/-/media/Project/Upfield/Brands/Violife-Foods/Violife-Foods-US-New/Assets/About-Us/upfieldviolife-technicalsummary-quantis-april2022.pdf?rev=7a8df5b1db044d6c9fbb67b16b22af09>

100% grated parmesan cheese, parmesan. (n.d.). CarbonCloud. Retrieved March 20, 2024, from: <https://apps.carboncloud.com/climatehub/product-reports/id/1055060199412>

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