TRUE COST LABEL +

UNSALTED AMSTERDAM

LCA REPORT: Merino Wool Supplychain

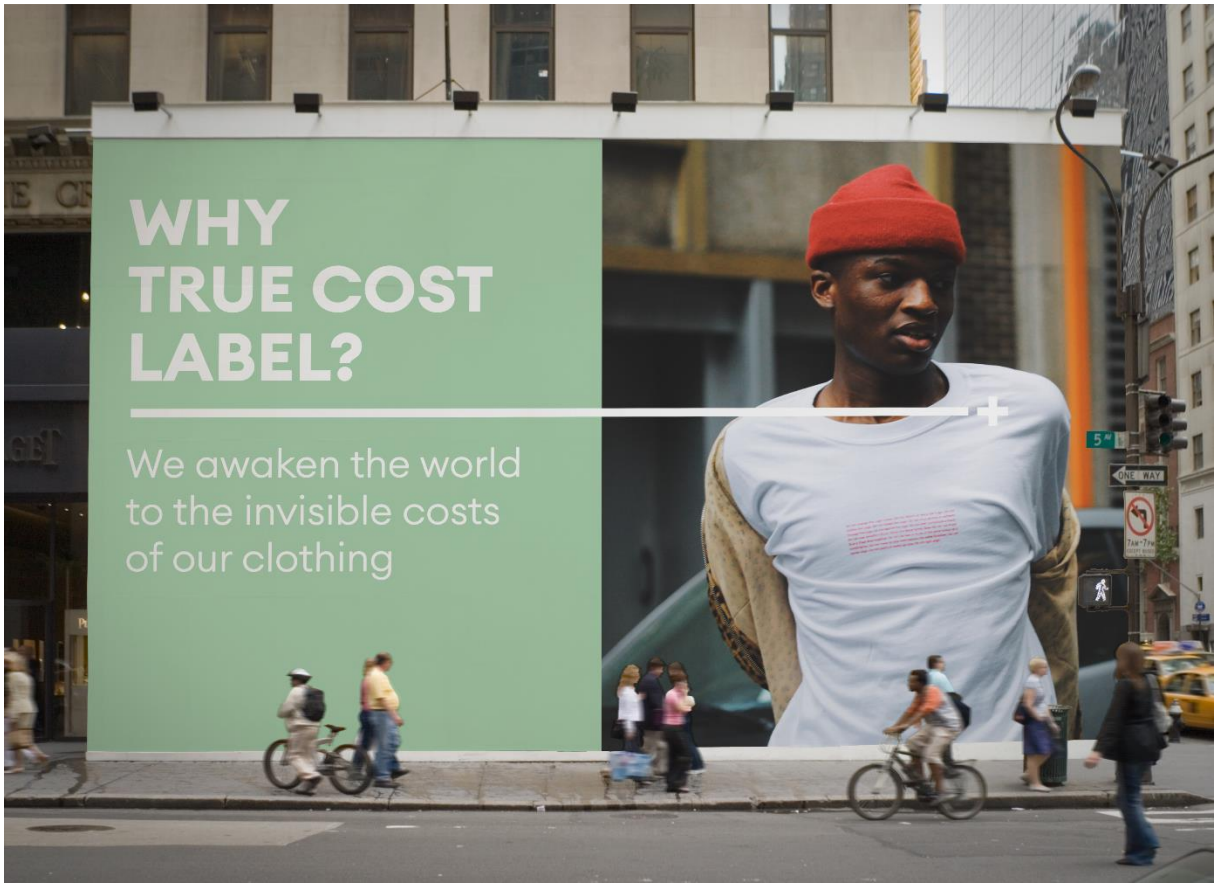
ABOUT THIS REPORT

This Life Cycle Analysis report has been constructed in consultation to Unsalted to reveal the invisible costs of their Pure Wool Supplychain and GOTS organic cotton supplychain. A True Cost Label impact profile has been calculated to show consumers the impact their products have on the planet and its people. To help consumers make more informed decisions, Unsalted' products are benchmarked with products of the same material weight according to conventional industrial practices, materials and locations. As a frontrunner, Unsalted understands the need for radical transparency which is why they partnered with True Cost Label to set up this Life Cycle Analysis.

OUR STORY

We are True Cost Label, a digital platform that makes it simple to buy and sell sustainable and ethical fashion. Let's face it. Our fashion has a huge impact on the environment, and the people who make it. We reveal these invisible costs. Piece by piece, we break down how each product affects our planet and its people. By translating complicated data into simple facts, we bring clarity. That's how we encourage more informed decisions that involve less pollution and fairer work conditions across the industry.

Finding a new favorite is already a challenge. Let sustainability be the easy part. We bring together conscious fashion brands with like-minded consumers. All in one spot. United as one force. Love the planet. Love your fashion.



LIFE CYCLE ANALYSIS

A Life Cycle Analysis, also known as LCA study, is a deep analysis of the supply chain. Whereas LCAs can be performed for any industry, True Cost Label specializes in those specifically for the fashion sector. An essential step in this, is the mapping of Unsalted supply chain.

The product is broken down at a component level, looking at every single kilogram of material and production process needed to make the garment. Consequently, the environmental and social impacts of the production of raw materials and the manufacturing of those materials into a final product is collected and computed into total figures. From the production and spinning of fibres to the dyeing, printing and CMT process and anything else imaginable within the typical supply chain of a garment.

Another important aspect of LCA is transport. For every product True Cost Label investigates, the transportation routes from the raw materials to the brand's store are tracked down and included in the impact calculation. This way, the total amount of kilometers a brand's product has traveled is displayed in its True Costs.

UNSALTED: PURE WOOL CHAIN

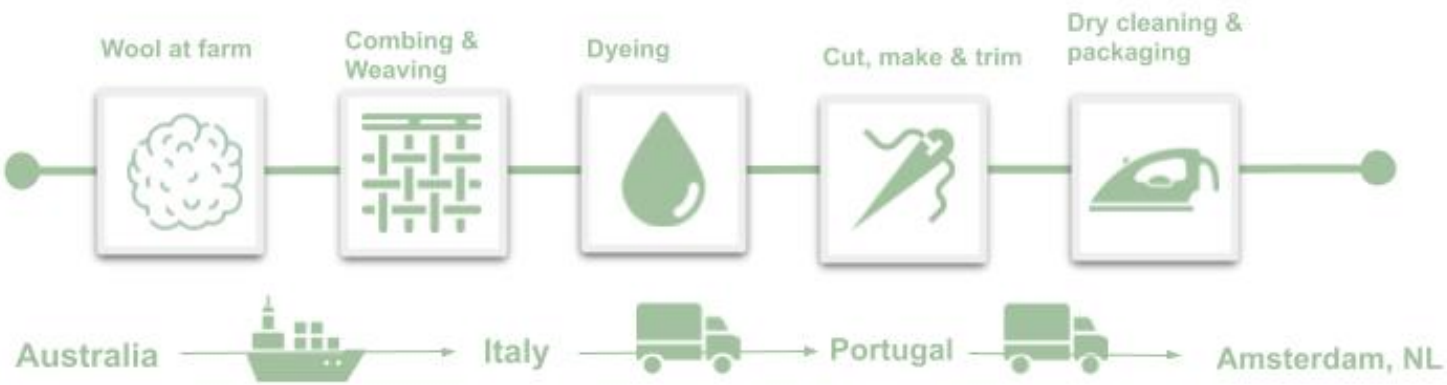
For Unsalted, True Cost Label conducted an LCA for their Pure Wool supplychain products: Pure wool trousers and Pure wool jackets. The garments within the Pure wool supplychain comes from Mulesing-Free Merino Wool produced in Austrailia.

Merino Wool is shipped to Italy where it is combed, spinned, woven into fabric and dyed to the right colour by Botto Giuseppe e Figli Spa which has reduced its water footprint by 30% in 2023 and ussd 75% renewable energy for its processes. Furthermore they aim to reduce chemical use by 40% and energy intensity by 7% in 2025.

The fabric is driven to Portugal where the manufacturing process continues. The product is cut and sewn into a garment, labels are added and the CMT including ironing and washing the product before final shipment is completed.

The lining of the product is made of standard cotton for the trousers and viscose for the jacket. The buttons are made of real horn.

Figure 1: *Unsalted Supply Chain*



Unsalted Pure Wool –Trousers

Size ‘M’ 429 grams, tapered/straight

No PRODUCT-AS-SERVICE

No UPCYCLED/**REUSED**

9,95 KILOGRAM CO_2-eq

280 LITER WATER

37500km AROUND THE WORD

No RECYCLED MATERIAL

Yes BIOBASED

LCA RESULTS

The results of this LCA are presented in the following table and in the figure above. A full table of the impact for all sizes is included in the appendix of this report.

Indicator	Unsalted: Pure wool trousers	Conventional Fast Fashion	Unit	Benchmark Versus conventional
Climate change	**9,95**	**18,77**	kg CO_2-eq	46% better
Water use	280	295	Liter	5% better
Total distance	~37500	**~4'6000**	Kilometer	20% better
Conventional product	Wool from australia, manufactured in Asia, standard cotton lining, conventional practices for combing, weaving, dyeing and CMT, shipped overseas to Netherlands.			

SOCIAL IMPACT

Unsalted’s wool comes from Congi farm, a family owned farm that uses non-toxic spray to safeguard the sheep. Unsalted chooses to work with Slowool, part of the Naturalis Fibra collection of Botto Giuseppe. These fabrics are from socially responsible wool, made with respect for the well-being of animals and the environment.

The CMT process is performed by a Portuguese manufacturer: Pedro Portuguesa, which has a strong focus on social impact and is a Sedex member. The Sedex platform has been helping businesses manage sustainability practices in their supply chain for over 20 years.

Unsalted Pure Wool – Jackets

Size 'M' 575 grams, double breasted (for single breasted see below)

No PRODUCT-AS-SERVICE

No UPCYCLED/**REUSED**

13,32 KILOGRAM CO_2-eq

184 LITER WATER

37500km AROUND THE WORD

No RECYCLED MATERIAL

Yes BIOBASED

LCA RESULTS

The results of this LCA are presented in the following table and in the figure above. A full table of the impact for all sizes is included in the appendix of this report.

Indicator	Unsalted: Pure wool jackets	Conventional Fast Fashion	Unit	Benchmark Versus conventional
Climate change	**13,22**	**25,16**	kg CO_2-eq	48% better
Water use	184	395	Liter	53% better
Total distance	+-37500	**+ -46000**	Kilometer	20% better
Single Breasted Variant	The single breasted design is 5% lighter than the double breasted design, the impact per product is therefore 5% lower (12,55 kg CO_2-eq / 175 L water). The benchmark ofcourse stays the same since it would be compared to a conventional product of the same weight.			
Conventional product	Wool from australia, manufactured in Asia, standard cotton lining, conventional practices for combing, weaving, dyeing and CMT, shipped overseas to Netherlands.			

REFLECTION & IMPROVEMENT

Breakdown of indicators

True Cost Label's LCAs are broken down in the following indicators:[1]

- Climate change expressed in kilograms of CO_2-equivalents[2];
- Water use expressed in liters of water;
- Distance traveled in number of kilometers.

In addition, various qualitative indicators and a social impact reflection is considered as shown in the previous page. By putting all these indicators together, True Cost Label aims to provide shoppers with the most complete picture of their product before purchasing it.

Impact visualization & compensation

Unsalted Pure wool trousers and jackets have a climate change impact of **9,95** kg CO_2 respectively 13,22/12,55 kg CO_2-eq per item (size M, all variants). The annual production of Pure Wool products in 2022 is 166 trousers and 169 jackets. In order to neutralize the total impact of these products, Unsalted would need to plant **153** full grown trees capturing CO_2 for a year to compensate the emissions. The total water use of the garments is equal to **28,5** m3 of water. Enough water to support the water demand of 1 family of four for ½ a year.

IMPACT REDUCTION STRATEGIES

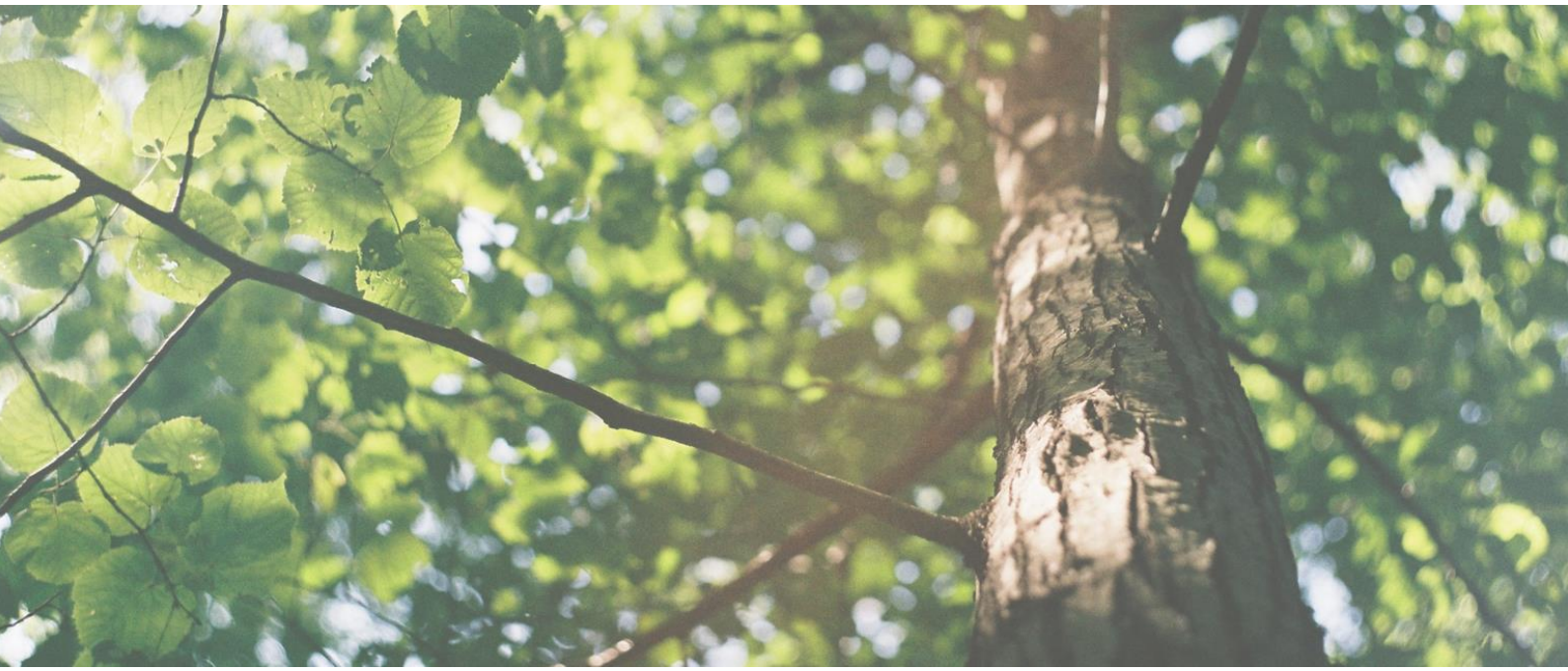
The impact Unsalted products have is significantly lower than conventional fast-fashion production. Nevertheless, True Cost Label provides Unsalted with several strategies to lower their impact even further. The strategies we recommend are:

Strategy	Description
Circular fibers	Eventhough Unsalted has a high focus on sustainability, ethical and biobased fibers, the farming process of sheep still has a large impact on climate change which is inherent for animal products. The biggest reduction possible in this case is to use recycled wool fibers which could cut impacts in the range of 70-90% of the original impact of merino wool.
The lining	The difference between the viscose lining of the jackets and the cotton lining of the trousers becomes apparent immediately when looking at the overall water use of the garments. It is recommended to apply GOTS organic cotton lining for the trousers and Lenzing TENCEL (viscose) fibers for the lining of the jackets. This would mostly impact water use.
Dyeing	Dyeing in any textile supplychain is an impactful step. Sustainable alternatives such as using natural cotton looks, spin-dyeing and pigments made from natural ingredients could provide a way to further reduce the impact of the garments. Portugal has some spin-dyeing suppliers that could be an interesting partner in this process.
Renewable Energy	If it can be proven that some suppliers use renewable energy such as solar panels, wind energy or geothermal energy, this could further reduce the total impact. Certificates would need to be uploaded for this.

[1] Chemical use not taken into account

[2] A CO_2 equivalent abbreviated as CO_2-eq is a measure used to compare emissions from various greenhouse gases on the basis of their global-warming potential (GWP).

IMPACT VISUALISATION



153 trees are needed to compensate the climate impact of Unsalted jackets (169) and trousers (166)

The unsalted trousers (166) and jackets (169) use the same water as a family of **four**

for ½ a year

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LCA ASSUMPTIONS

The following summary represents some important assumptions made during the Life Cycle Analysis conducted for Unsalted:

- Assumption 1: Distances for the supply chain were calculated using Google Maps, Sea-distances.org and estimations plus assumptions for some suppliers' locations.

- Assumption 2: Euro 5 truck with 24 tonne capacity used for modelling transport emissions

- Assumption 3: Lining is 10% of the garment weight.

- Assumption 4: standard packaging assumed

- Assumption 5: standard dyeing assumed

-Assumption 6: Ironing, steaming, laser cutting are all modelled with average power consumption for those devices.

- Assumption 7: Viscose from Asia assumed

Assumption 8: Combing takes place in Italy, but is modelled as a complete process taking place in Australia due to lack of data for italian combing facilities, sensitivity is low on total impact.

LIFE CYCLE INVENTORY

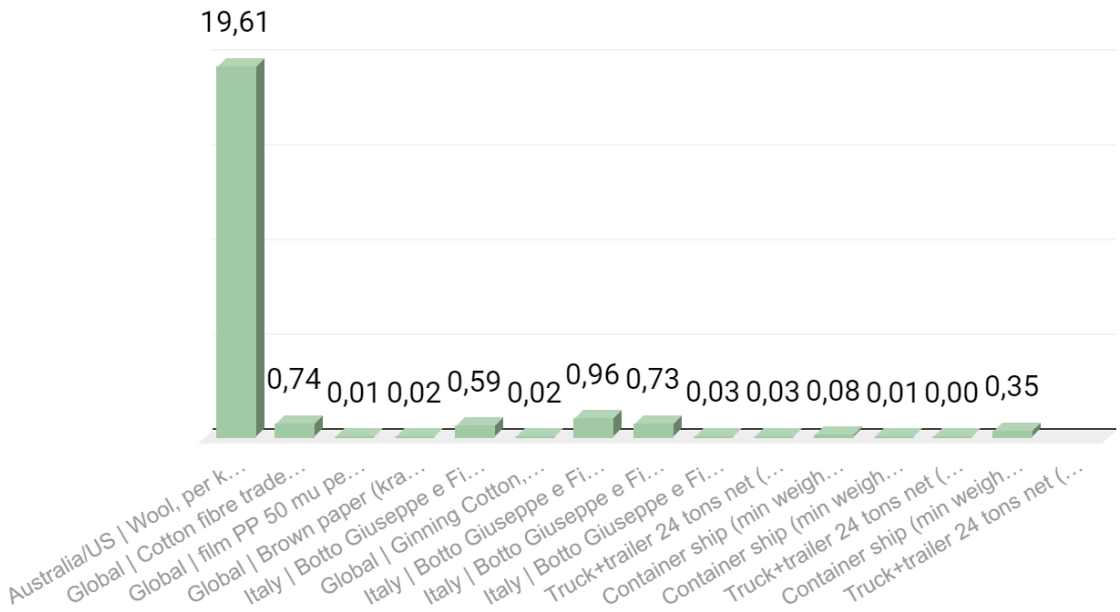
Trousers:

Raw material production	Qty/unit
Australia/US | Wool, per kg, EC allocation, incl. combing and other pretreatments	0,9 kg
Global | Cotton fibre trade mix / Asia | Viscose Fibre	0,1 kg
Global | film PP 50 mu per m2	0,1 kg
Global | Brown paper (kraft liner), FSC 70 gr/m2	0,1 kg
Manufacturing	**Qty/unit**
Global | Ginning Cotton, machine ginning + hot air drying,	0,1 kg
Italy | Botto Giuseppe e Figli Spa | Ring-Spinning 200 decitex, 75% renewable, 3,5% less energy intense	1 kg
Italy | Botto Giuseppe e Figli Spa | Dyeing, 30% less water, 20% less chemicals, 75 %renewable, 3,5% less energy intense	1 kg
Italy | Botto Giuseppe e Figli Spa | Weaving, 75% renewable, 3,5% less energy intense	1 kg
Italy | Botto Giuseppe e Figli Spa | CMT, 75% renewable, 3,5% less energy intense	1 kg
Transport	**Qty/unit**
Truck+trailer 24 tons net (min weight/volume ratio 0,32 ton/m3) (tkm)	405 kgkm
Container ship (min weight/volume ratio 0,41 ton/m3)	16020 Kgkm
Container ship (min weight/volume ratio 0,41 ton/m3)	1500 Kgkm
Truck+trailer 24 tons net (min weight/volume ratio 0,32 ton/m3) (tkm)	25 kgkm
Truck+trailer 24 tons net (min weight/volume ratio 0,32 ton/m3) (tkm)	4100 kgkm

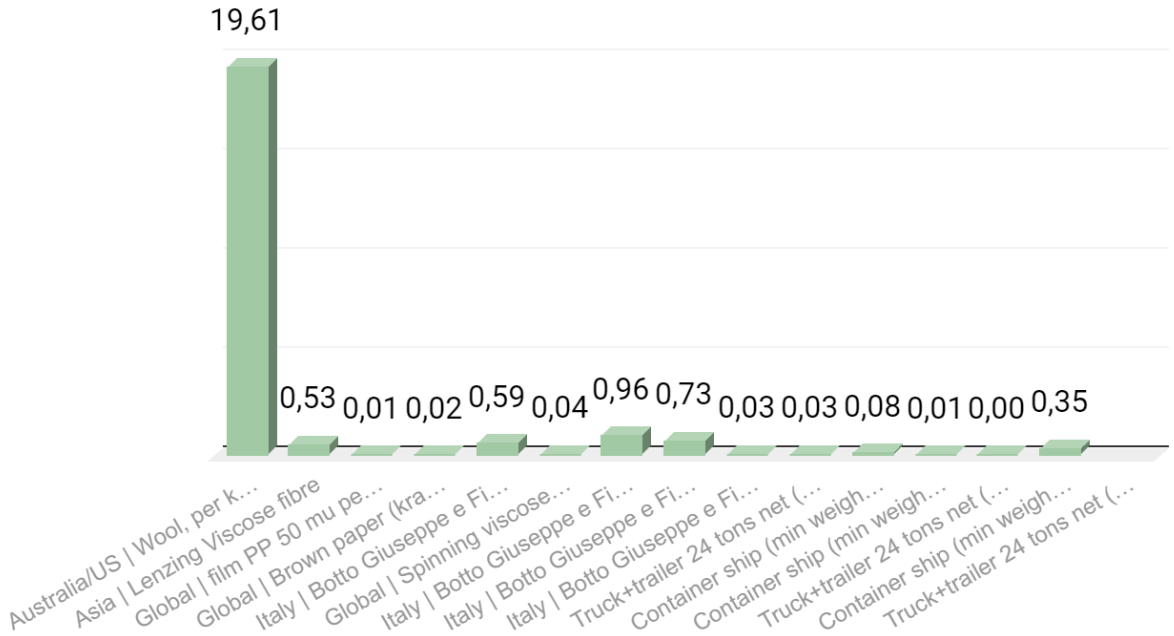
IMPACT PER PROCESS

Climate change, kg CO_2-eq /kg product

Trousers

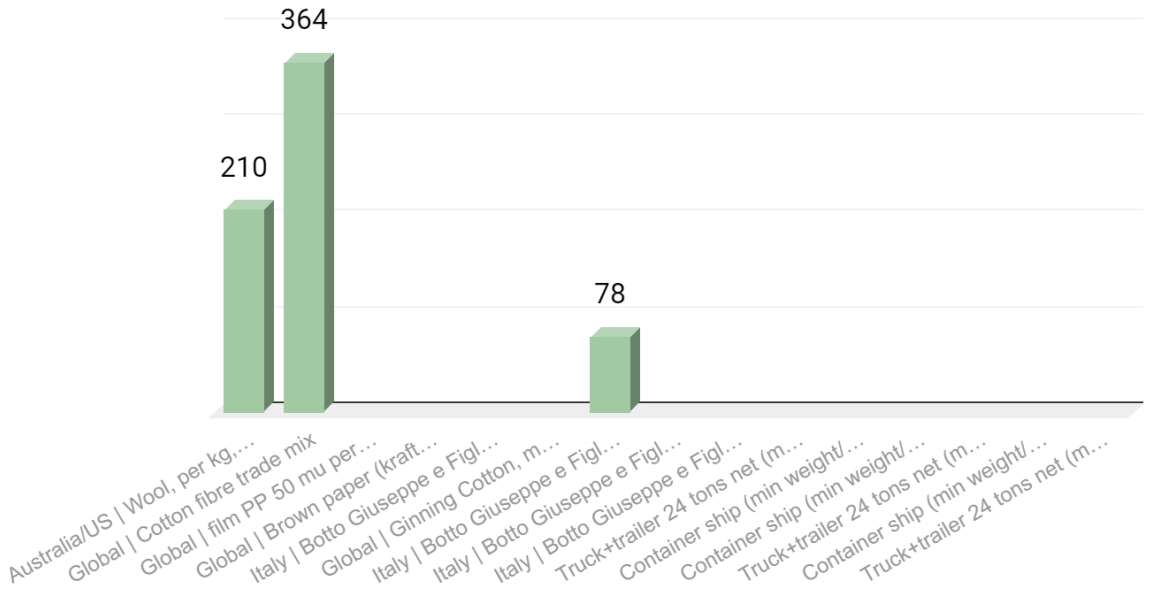


Jackets

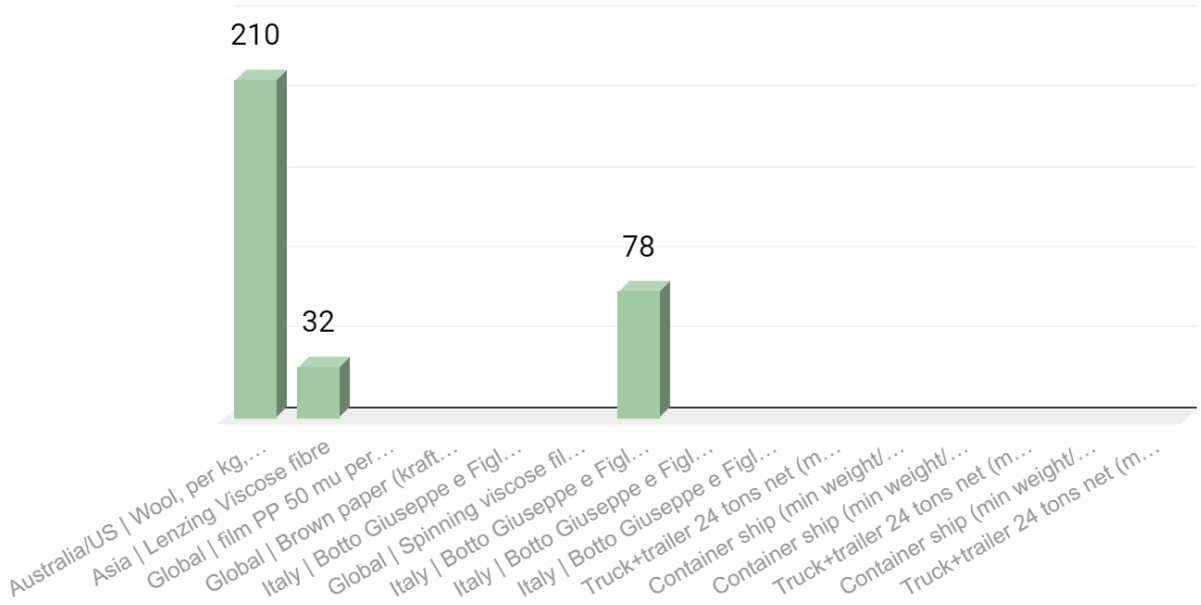


Water use, Liters / kg product

Trousers



Jackets



DETAILED TECH. EXPLANATION

TCL - True Cost Label

Technical Explanation

All LCAs made by True Cost Label B.V. including the data and methods contained within are calculated using our own developed tool, the 'True Cost Generator'. A custom LCA tool built by True Cost Label, specifically for Fashion LCAs and the detailed supply chains of the fashion industry.

1 **Software, Databases and Methodology applied.**
We apply OpenLCA[1] software to access input data for the True Cost Generator, with data mainly but not exclusively deriving from the following databases:
Ecoinvent 3.6 [2];
Idemat 2021 by TU Delft [3];.

2 **We apply the following Impact Assessment Methods for data retrieved and used in our LCAs**
A) Carbon footprint: IPCC 2013 GWP 100a [4] as recommended by the European Platform on Life Cycle Assessment: ILCD [5] (International Reference Life Cycle Data System and the Greenhouse Gas Protocol
B) Water Depletion: ILCD 2011; Resource depletion - water; midpoint; freshwater scarcity; Swiss Ecoscarcity 2006.
C) Total distance in kilometer and mode of transport: Supply chain data provided by the customer in combination with Google maps and Sea Distances.

In addition, LCA data is included from carefully selected LCAs from peer reviewed scientific papers. This is mostly done for innovative textile production processes or processes poorly modelled in existing databases. Assumptions made for these additions are stated in detail in each report

3 **Goal and scope**
We calculate our LCAs with a functional unit of total impact per kg of product from the raw materials to the manufacturing of the product with all transport processes included. (Cradle-to-Gate).

4 **Standardization**
True Cost Label Applies the ILCD method for its impact numbers, which is standardized according to EU-PEF method: European Product Environmental Footprint (EC, 2018. Product environmental footprint category rules, version 6.3). Our LCAs, LCA Reports and advise given based on LCA results follow the general principles of the ISO14044 quality standard for Life Cycle Assessment

5 **Benchmarking**
All products on the True Cost Label platform have their impact benchmarked to a product of the same make and build, but then following conventional production and manufacturing standards which is most common and average for the industry. Our conventional t-shirt, is a t-shirt made with commodity trademix cotton originating in an average Asian production country (i.e. China, India, Bangladesh). The t-shirt is produced according to the manufacturing standards of fast fashion production, using average spinning, knitting or weaving, dyeing, embroidering, printing and other techniques based on an average energy grid representative for those countries and industries.

6 **References:**
1. https://www.openlca.org/
2.https://ecoinvent.org/the-ecoinvent-database/
3. https://www.ecocostsvalue.com/
4. https://www.ipcc.ch/
5.https://eplca.jrc.ec.europa.eu/uploads/ILCD-Recommendation-of-methods-for-LCIA-def.pdf
6. https://www.iso.org/standard/38498.html

REFERENCES

Practical LCA data is included based on carefully selected LCIs from peer reviewed papers, scientific databases for various textile processes and several business literature sources for impact comparisons:

- Average yearly carbon compensation of trees: Encon (2020), Trees for all (2020), IPCC (2020), Climate Neutral Group (2020), Arbor Environmental Alliance (2020)

- Average yearly water use of households (multiple sources): Engie: Gemiddeld waterverbruik in Nederland, Vewin 2019, omgerekend door Nibud 2019 en Waternet 2020

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FINAL NOTE

The LCAs conducted by True Cost Label are continuously updated and improved in line with changing regulations, standardizations and new publications of data sources providing increasingly higher data quality. Therefore, it may be the case that these numbers will be updated in the future at the product display on the True Cost Label platform.

True Cost Label aims for 100% transparency 100% of the time. That said, the ultimate goal is to use actual factory data from the very supply chain parties involved in the Cradle2Gate lifecycle of every product that runs on the platform. This way all brands connected to True Cost Label will be at a 100% transparency with real-time impact data of the product's supply chain. To ensure this goal True Cost Label will keep innovating and streamlining its processes.

Only together we will be able to shift the fashion industry into a new sustainable paradigm. United as one force. Love the planet, love your fashion.