Pesto alla Genovese sauce

Environmental Product Declaration

1 EPD PROCESS

The first EPD process certified in the Food industries

Barilla

Barilla
The Italian Food Company. Since 1877.

EPD®
ENVIRONMENTAL PRODUCT DECLARATION

REGISTRATION NUMBER
S-P-00494

CPC CODE
23995 Sauces
PCR 2010:19
v. 3.12 - 06.09.2019

PUBLICATION DATE
2015/09/01

REVISION
4 of 2020/06/30

VALID UNTIL
2025/06/29

PROGRAMME
The International EPD® System
www.environdec.com

PROGRAMME OPERATOR
EPD International AB

This EPD has been developed in conformity to ISO 14025. An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com.

1. Brand and product

THE BRAND BARILLA

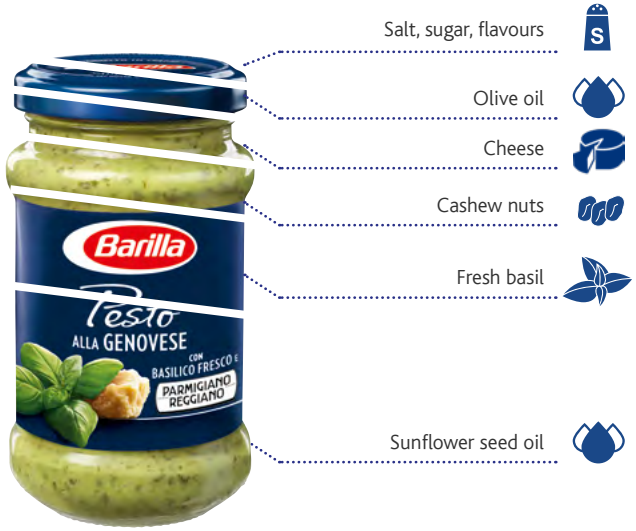
The Brand Barilla, born in the 1877 from a small pasta shop in Parma, represents now one of the most known pasta's brand around the world.
Barilla is a leading company in the Italian and international pasta market, where it operates with the Barilla brand, as a symbol of Italian cuisine, and three major local brands (Misko in Greece, Filiz in Turkey and Yemina in Mexico). Barilla is also active in the segment of pasta sauces, with over 35 different recipes to meet everyone's taste worldwide.

Further information on **Barilla** website.

THE PLANT AND THE PROCESS

Pesto sauces are produced in an owned plant located in Rubbiano (Italy), where the preparation is very close to what people would do at home.
The process starts from basil prepatation (washing and drying); basil is then added to other ingredients and mixed.
Pesto sauce undergoes a heat treatment to pasteurize the product while preserving flavor and taste as much as possible over time. The pasteurization treatment, coupled with the integrity of the container, allows us to avoid using any preservatives.
The product is sold in package of 190 grams jar in two recipe: with garlic, directed to both for local (Italian) and export market, and witout garlic, directed to local (Italian) market only.
The Pesto can be poured directly cold on the cooked pasta; for an even more creamy consistency a little amount of cooking water can be added.
Sauce may be heated up before the consumption.

THE PRODUCT

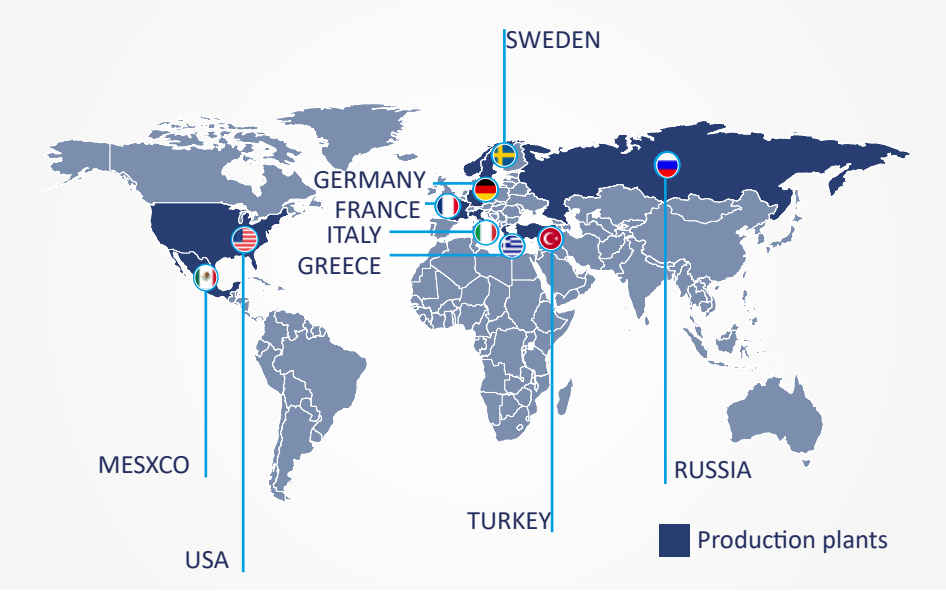


NUTRITIONAL INFORMATION (per 100 g)		
Energy	kcal kJ	482 1 989
Fats *of which saturated*	grams	46 *5.3*
Carbohydrates *of which sugars*	grams	9.8 *5.5*
Fibres	grams	5.0
Proteins	grams	4.7
Salt	grams	3.250

2. Barilla group

Founded in Parma in 1877 from a bakery and pasta-making store, Barilla is now one of Italy's biggest food groups, world leader on the pasta market and number one in ready-to-use sauces in mainland Europe, bakery products in Italy and crispbreads in the Scandinavian countries. The Barilla Group has 28 production sites (14 in Italy and 14 abroad) and exports to more than 100 countries.
Every year, its plants produce about 1 800 000 tons of food products, enjoyed by consumers all over the world, under the Barilla, Mulino Bianco, Harrys, Pavesi, Wasa, Filiz, Yemina and Vesta, Misko, Voiello, Gran Cereale, Pan di Stelle and Academia Barilla brands.

Further information on www.barillagroup.com



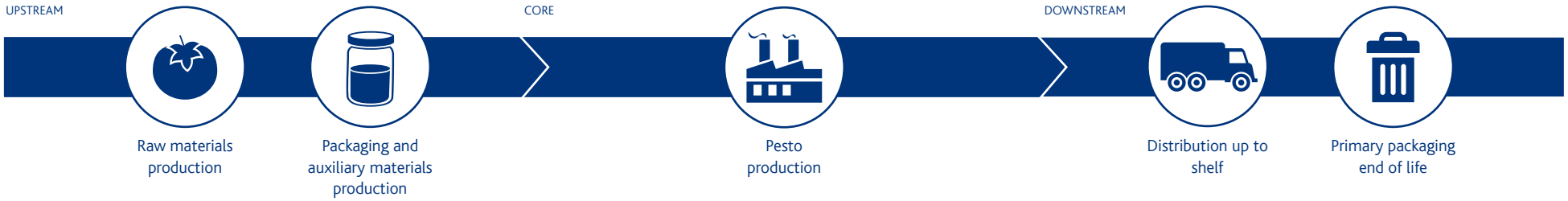
Good for You, Good for the Planet

When he opened his store in 1877, Pietro Barilla's overriding aim was to make good food. Today, that principle has become Barilla's corporate mission: "Good for You, Good for the Planet".

GOOD FOR YOU *means: continuously improving the nutritional profile of existing products and launching new products that are tasty, safe and contribute to a balanced diet; and promoting healthy lifestyles and sustainable diet inspired by the Italian lifestyle and Mediterranean Diet.*

GOOD FOR THE PLANET *means: improving the efficiency of production processes in order to reduce greenhouse gas emissions and water consumption; and promoting more sustainable agricultural and farming practices for all of the Group's strategic supply chains.*

3. Environmental performance calculations



The environmental performance of the product was calculated using the **LCA (life cycle analysis)** methodology, including the entire production chain, beginning with growing the vegetables up until delivery of the finished product to the main distribution platforms.
The study was conducted following the specific product rules (PCR) published by the EPD system: "CPC code 23995 – Sauce". The generic data contributes to the calculation of environmental impacts is lower than 10%.

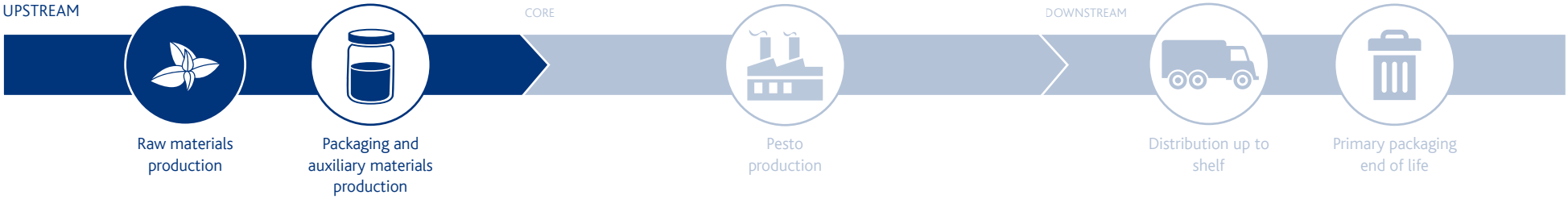
DECLARED UNIT

Data are referred to **1 kg** of product plus the related packaging (the packaging is referred to the **190 g** format, reported to 1 kg of product).

SYSTEM BOUNDARIES

The processes constituting the analysed system were organized in upstream, core and downstream processes, in compliance with the requisites of the EPD system.

4. Raw material production



INGREDIENTS PRODUCTION

BASIL and BASIL SEMI-FINISHED PRODUCT

Impacts related to the basil cultivation and basil semi-finished product have been calculated on the basis of primary data (yields and fertilizer use) collected by farmers. Information are related to 2015 crop.

VEGETABLE OILS

Data for sunflower oil cultivation come from secondary data (collected from Agrifootprint database), the extraction and refinery data come from literature (Nilsson et al.. 2010).
Data for olive oil cultivation come from secondary data (collected from Ecoinvent 3 database) and the refinery data come from literature (Tsarouhas, 2015).

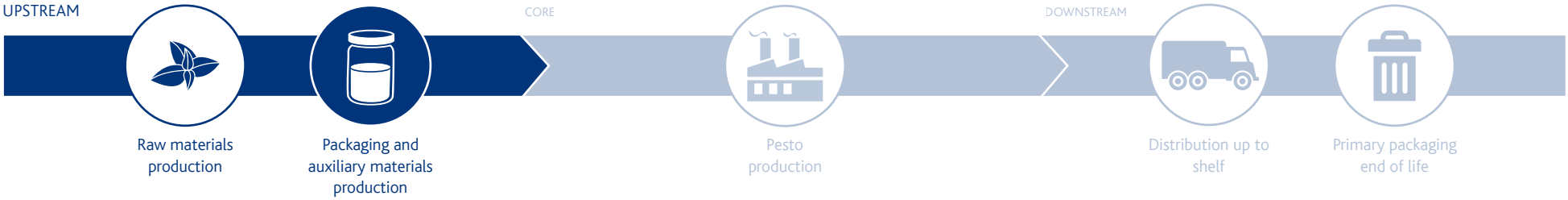
CASHEW NUTS

Impacts related to cashew nuts come from literature (Marinussen 2012).

OTHER INGREDIENTS

Data related to cheese, salt and other raw materials have been collected by LCA database (mainly Ecoinvent).

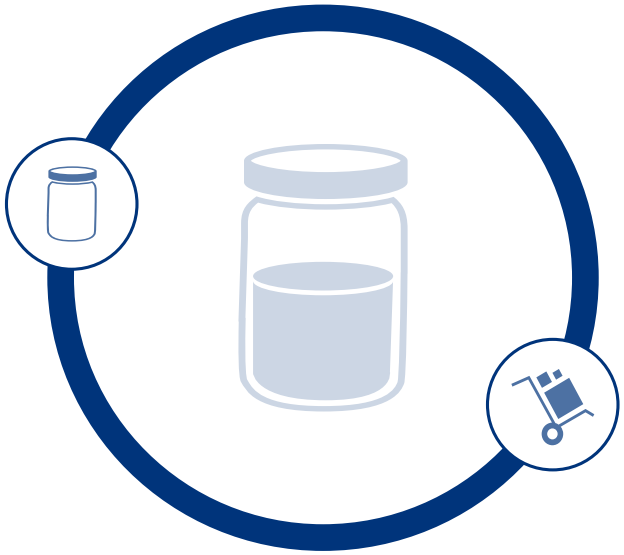
5. Packaging production



PRIMARY PACKAGING

Packaging environmental performances are calculated using the190g formats and are reported per packaging used for 1 kg of product.
The primary packaging consists in glass jar with screw top.

Primary data (from packaging unit) are used for packaging amount and packaging materials production; data about packaging production process come from Barilla LCA database.



PACKAGING PRODUCTION

Since 2004. Barilla designs new packaging with the"LCA packaging design tool". It allows the assessment of the environmental impacts of the packaging solutions already during the design phase.

PACKAGING FOR TRANSPORTATION

The packaging for transport consists in cardboard boxes (american box), used for the distribution of the product, and a plastic extensible film. Boxes are made mainly by recycled cardboard carton (pre and post consumer).
Data used have been collected from LCA databases (mainly Ecoinvent).

Packaging used for Barilla products is 100% designed for recycle.

Auxiliary materials environmental performances are evaluated by using primary data from plant, during 2019 year.
Secondary data (Ecoinvent) are used for environmental aspects associated to materials production.

6. Sauce production

GENERAL INFORMATION

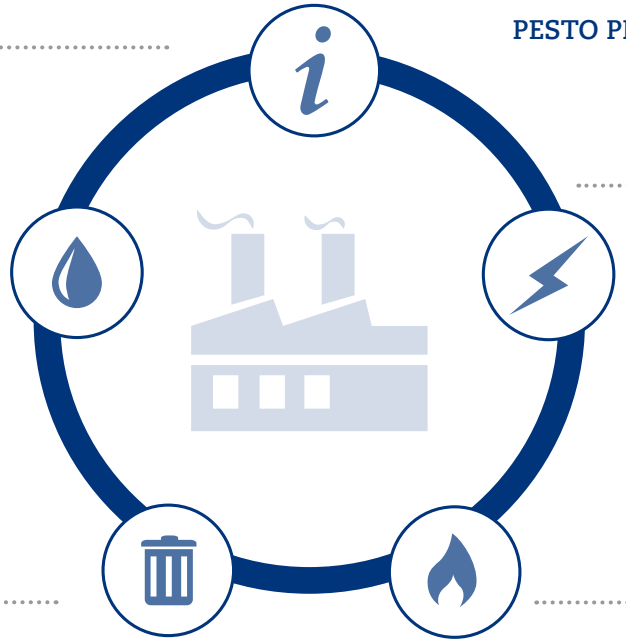
The environmental performance related to production processes is evaluated by considering the energy and the water consumption and the waste production as primary data. Secondary data (mainly Ecoinvent) are used for the environmental aspects related to the production of energy and water.

WATER

Water consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.
Plant water consumption includes also the water amount needed for ingredients preparation: this amount is included both in plant consumption and product recipe following a precautionary approach.
Data refer to sauce production in 2019.

WASTE

The primary data are collected by the plant registrations. The overall value is attributed to the product using the mass allocation procedure.
Data refer to sauce production in 2019.



PESTO PRODUCTION

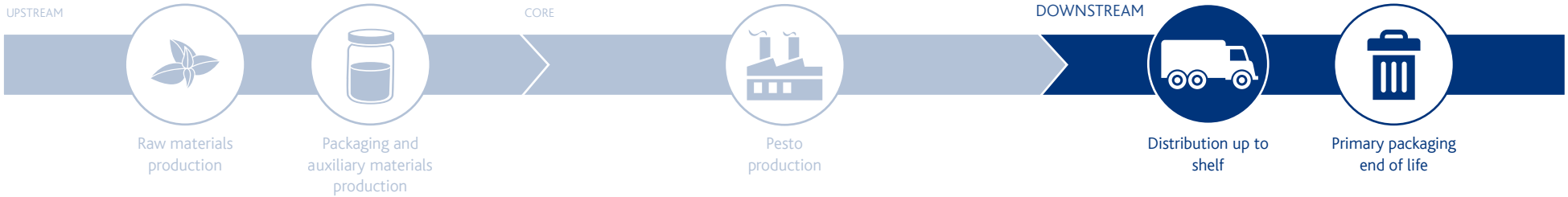
ELECTRICITY

Total plant electricity consumption has been divided using the mass allocation procedure, as the plant produces a number of different sauces.
Barilla, through the GO certification system (Guaranty of origin market), buys energy from hydroelectric renewable resources as to cover the entire Rubbiano sauce production.
Data are referred to 2019.

NATURAL GAS

Natural gas consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.
Data refer to sauce production in 2019.

7. Distribution



DISTRIBUTION

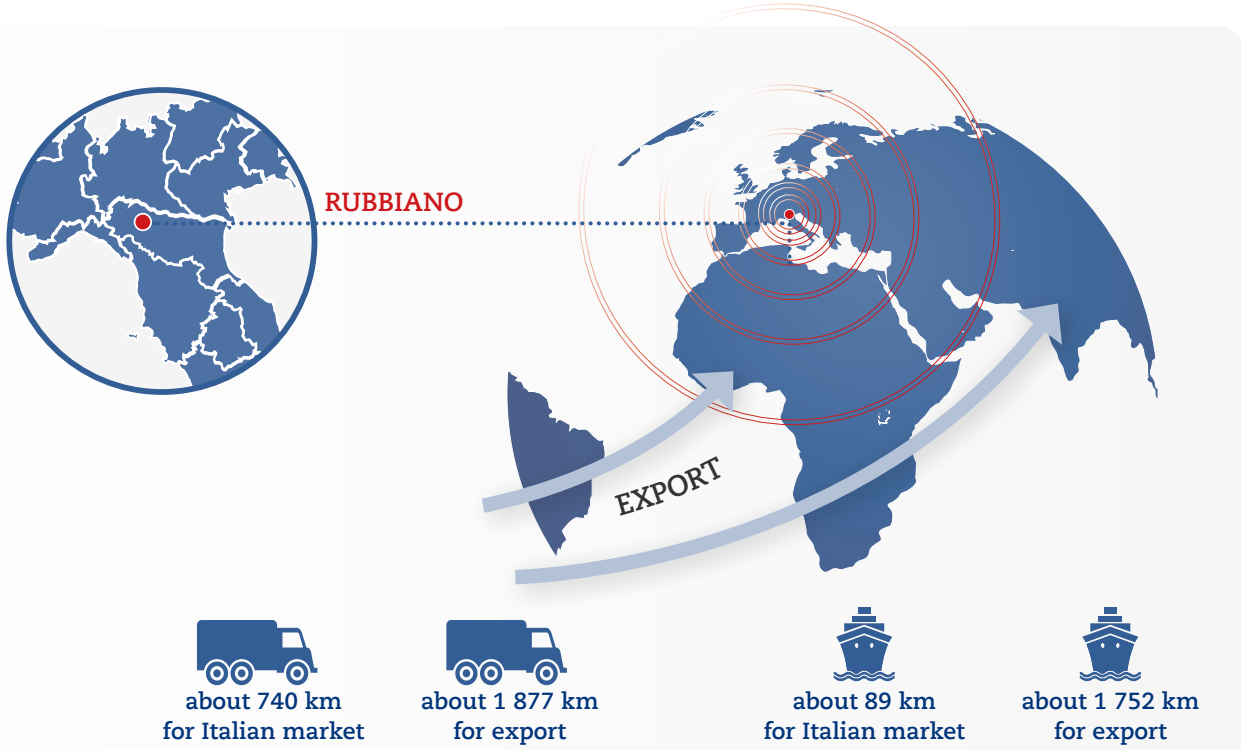
Pesto alla genovese sauce is produced in Barilla's Rubbiano plant, Italy.

Distribution performance were calculated for Pesto without garlic only for local consumption (Italy), while for the classic pesto recipe the following hypotheses has been used:

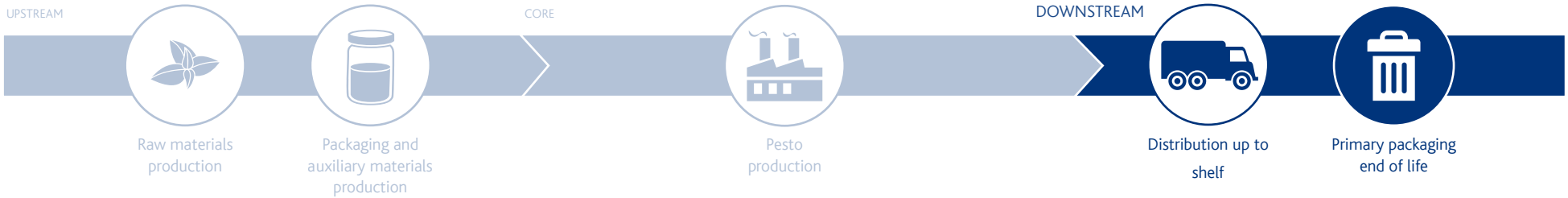
- 23% of production is intended for the Italian market,
- 77% is intended for export

Distribution performance were calculated considering the transport for about 740 km by truck in Italy and 1 877 km by truck plus 1 841 km by ship in other countries.

The product does not require special storage conditions (refrigeration, etc).
The impacts related to the disposal of the packaging for transport have been calculated only for local consumption considering the Italian scenario for paper/board (81% recycling, 8% energy recovery, 11% landfilling) and plastic film (13% recycling, 71% energy recovery, 16% landfilling).



8. Primary packaging end of life



In Italy, recyclable glass packaging for selective waste collection in urban areas is usually sent to:

71% RECYCLE

Avoiding the production of virgin glass.

29% DISPOSAL

In Italy, 23%of waste sent to disposal are incinerated without energy recovery, the remaining part goes to landfill

GL 70
VASETTO
VETRO
Raccolta
VETRO

75% RECYCLE

Avoiding the ore mining.

25% DISPOSAL

In Italy, 23%of waste sent to disposal are incinerated without energy recovery, the remaining part goes to landfill

FE 40
CAPSULA
METALLO
Raccolta
METALLO

Data elaborated from CONAI 2018 Report.

9. Environmental results Pesto alla Genovese - local consumption

USE OF RESOURCES data referred to1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	7,47E+00	1,61E+00	9,55E-01	6,79E-03	2,41E-05	**1,00E+01**
	Used as raw materials*	0,00E+00	1,14E-01	0,00E+00	0,00E+00	0,00E+00	**1,14E-01**
	Total	**7,47E+00**	**1,72E+00**	**9,55E-01**	**6,79E-03**	**2,41E-05**	**1,02E+01**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	1,48E+01	1,20E+01	5,26E+00	2,60E+00	2,98E-03	**3,46E+01**
	Used as raw materials	0,00E+00	1,74E-01	0,00E+00	0,00E+00	0,00E+00	**1,74E-01**
	Total	**1,48E+01**	**1,22E+01**	**5,26E+00**	**2,60E+00**	**2,98E-03**	**3,48E+01**
Secondary Material (g)		0,00E+00	2,44E+02	0,00E+00	0,00E+00	0,00E+00	**2,44E+02**
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Non-renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Net use of fresh water (liters)		1,62E+02	1,63E+01	4,80E+00	1,28E-01	1,18E-03	**1,83E+02**

OUTPUT FLOWS data referret to1 kg of product	UPSTREAM		CORE	DOWNSTREAM		TOTAL
	Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
Waste to animal feed or similar (g)	0,00E+00	0,00E+00	5,51E+01	0,00E+00	0,00E+00	**5,51E+01**
Components for reuse (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Materials for recycling (g)	1,27E+00	8,21E+01	2,02E+02	1,69E+01	5,59E+02	**8,62E+02**
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	4,11E-03	3,90E-04	**4,50E-03**
Exported energy, electricity (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Exported energy, thermal (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**

Secondary energy resources and recovered energy flows do not show relevant contributions.

**The biomasses transformed into the product are not considered.*

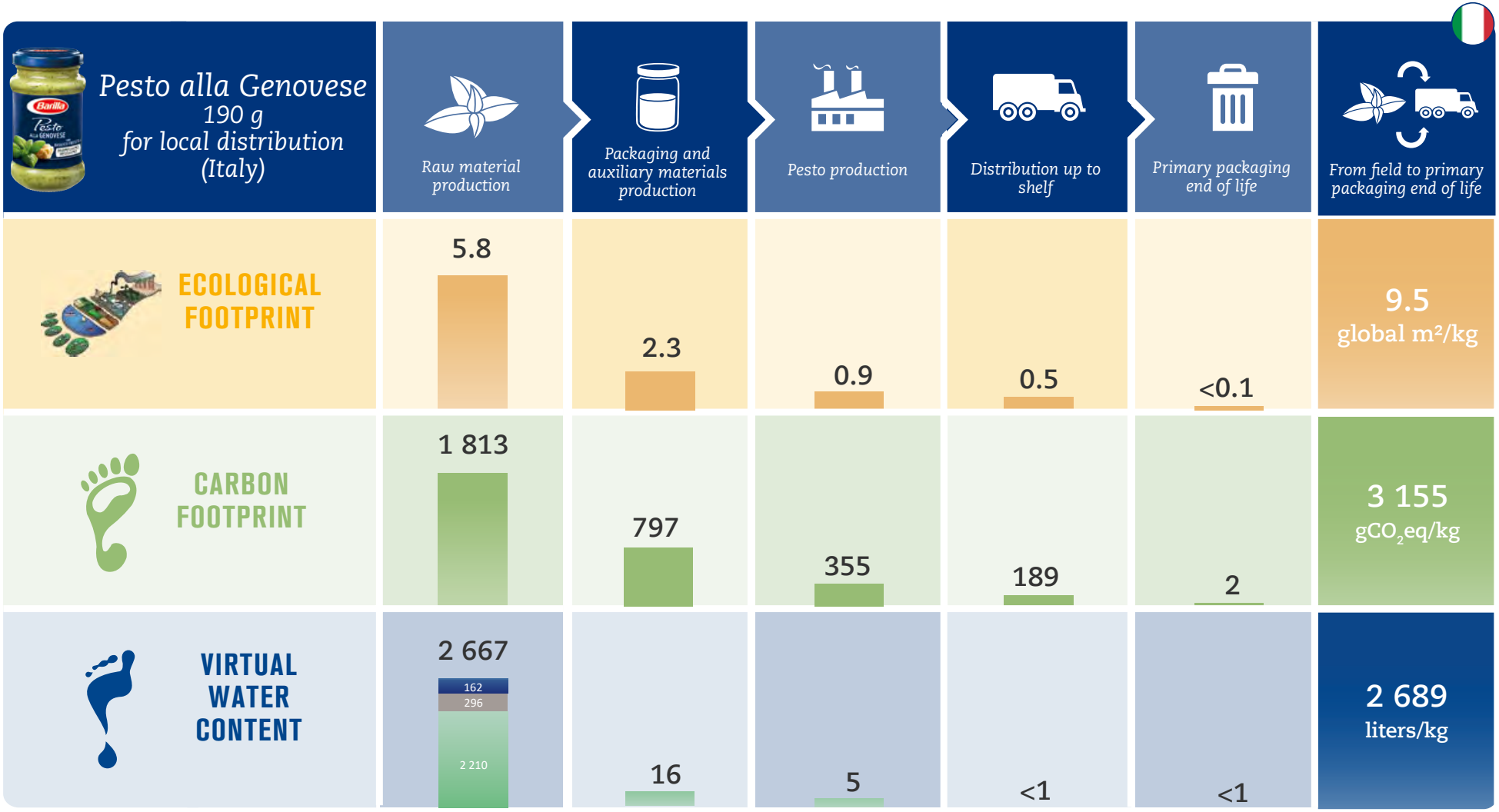
POTENTIAL ENVIRONMENTAL IMPACTS data referret to1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	1,41E+03	7,91E+02	3,49E+02	1,86E+02	3,90E-01	**2,74E+03**
	Biogenic	2,89E+02	4,17E+00	6,10E+00	2,68E+00	1,24E+00	**3,04E+02**
	Land use and land transformation	1,14E+02	1,64E+00	4,53E-03	3,41E-03	2,53E-05	**1,16E+02**
	Total	**1,81E+03**	**7,97E+02**	**3,55E+02**	**1,89E+02**	**1,63E+00**	**3,15E+03**
Acidification Potential - g SO_2 eq.		2,24E+01	3,99E+00	1,08E+00	9,89E-01	1,25E-03	**2,85E+01**
Eutrophication Potential - g PO_4^{---} eq.		1,15E+01	6,71E-01	2,30E-01	1,64E-01	1,09E-03	**1,25E+01**
Photochemical Oxidant Formation Potential - gNMVOC eq		5,57E+00	3,42E+00	1,32E+00	1,25E+00	2,06E-03	**1,16E+01**
Abiotic Depletion Potential - Elements g Sb eq.		6,29E-04	5,28E-03	3,94E-07	3,74E-07	3,27E-09	**5,91E-03**
Abiotic Depletion Potential - Fossil fuels - MJ, net calorific value		1,30E+01	1,17E+01	5,24E+00	2,59E+00	2,94E-03	**3,26E+01**
Water scarcity potential, m3 eq.		3,21E+01	3,32E+00	1,72E-01	5,31E-03	-6,52E-04	**3,56E+01**

WASTE PRODUCTION data referret to1 kg of product	UPSTREAM		CORE	DOWNSTREAM		TOTAL
	Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
Hazardous waste disposed*	5,04E-03	1,20E+00	1,62E-02	0,00E+00	0,00E+00	**1,2E+00**
Non-Hazardous waste disposed*	1,38E+02	6,25E+00	6,61E+01	2,85E+00	1,72E+02	**3,8E+02**
Radioactive waste disposed	4,21E-01	0,00E+00	9,82E-02	9,44E-02	1,29E-04	**0,0E+00**

The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO_2 is equal to zero, since the absorbed amount is equal to the emitted biogenic CO_2 within the reference 100 years period.

** Only flows coming from processes under direct Barilla control were considered, flows generated by secondary data were excluded.*

PRODUCT ENVIRONMENTAL PERFORMANCE



10. Environmental results Pesto alla Genovese - export destination

USE OF RESOURCES data referred to1 kg of product		UPSTREAM Raw material production	UPSTREAM Packaging and auxiliary materials production	CORE Production	DOWNSTREAM Distribution up to shelf	TOTAL
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	7,47E+00	1,61E+00	9,55E-01	1,94E-02	**1,01E+01**
	Used as raw materials*	0,00E+00	1,14E-01	0,00E+00	0,00E+00	**1,14E-01**
	Total	**7,47E+00**	**1,72E+00**	**9,55E-01**	**1,94E-02**	**1,02E+01**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	1,48E+01	1,20E+01	5,26E+00	7,55E+00	**3,96E+01**
	Used as raw materials	0,00E+00	1,74E-01	0,00E+00	0,00E+00	**1,74E-01**
	Total	**1,48E+01**	**1,22E+01**	**5,26E+00**	**7,55E+00**	**3,98E+01**
Secondary Material (g)		0,00E+00	2,44E+02	0,00E+00	0,00E+00	**2,44E+02**
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Non-renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Net use of fresh water (liters)		1,62E+02	1,63E+01	4,80E+00	3,64E-01	**1,83E+02**

OUTPUT FLOWS data referret to1 kg of product	UPSTREAM Raw material production	UPSTREAM Packaging and auxiliary materials production	CORE Production	DOWNSTREAM Distribution up to shelf	TOTAL
Waste to animal feed or similar (g)	0,00E+00	0,00E+00	5,51E+01	0,00E+00	**5,51E+01**
Components for reuse (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Materials for recycling (g)	1,27E+00	8,21E+01	2,02E+02	0,00E+00	**2,85E+02**
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Exported energy, electricity (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Exported energy, thermal (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**

Secondary energy resources and recovered energy flows do not show relevant contributions.

**The biomasses transformed into the product are not considered.*

POTENTIAL ENVIRONMENTAL IMPACTS data referret to1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	1,41E+03	7,91E+02	3,49E+02	5,27E+02	**3,08E+03**
	Biogenic	2,89E+02	4,17E+00	6,10E+00	4,00E-02	**3,00E+02**
	Land use and land transformation	1,14E+02	1,64E+00	4,53E-03	9,99E-03	**1,16E+02**
	Total	**1,81E+03**	**7,97E+02**	**3,55E+02**	**5,27E+02**	**3,49E+03**
Acidification Potential - g SO_2 eq.		2,24E+01	3,99E+00	1,08E+00	2,88E+00	**3,04E+01**
Eutrophication Potential - g PO_4^{---} eq.		1,15E+01	6,71E-01	2,30E-01	4,07E-01	**1,28E+01**
Photochemical Oxidant Formation Potential - gNMVOC eq		5,57E+00	3,42E+00	1,32E+00	3,08E+00	**1,34E+01**
Abiotic Depletion Potential - Elements g Sb eq.		6,29E-04	5,28E-03	3,94E-07	1,05E-06	**5,91E-03**
Abiotic Depletion Potential - Fossil fuels - MJ, net calorific value		1,30E+01	1,17E+01	5,24E+00	7,51E+00	**3,75E+01**
Water scarcity potential, m3 eq.		3,21E+01	3,32E+00	1,72E-01	1,60E-02	**3,56E+01**

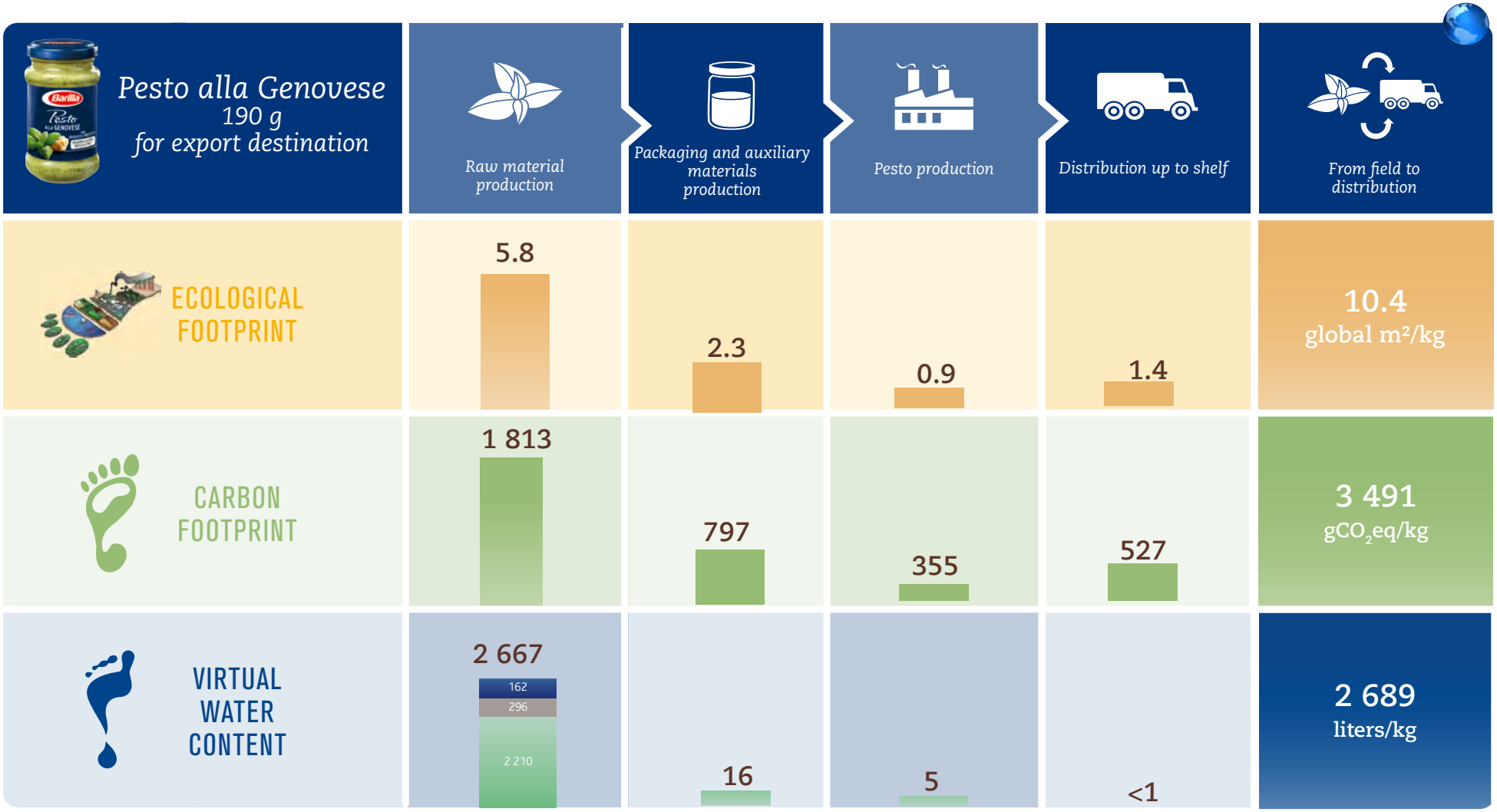
WASTE PRODUCTION data referret to1 kg of product	UPSTREAM		CORE	DOWNSTREAM	TOTAL
	Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	
Hazardous waste disposed*	5,04E-03	1,20E+00	1,62E-02	0,00E+00	**1,2E+00**
Non-Hazardous waste disposed*	1,38E+02	6,25E+00	6,61E+01	0,00E+00	**2,1E+02**
Radioactive waste disposed	4,21E-01	4,18E-01	9,82E-02	2,73E-01	**1,2E+00**

The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO_2 is equal to zero, since the absorbed amount is equal to the emitted biogenic CO_2 within the reference 100 years period.

* *Only flows coming from processes under direct Barilla control were considered, flows generated by secondary data were excluded.*

Primary and secondary packaging end of life performances are not provided due to the high number of involved countries for export distribution.

PRODUCT ENVIRONMENTAL PERFORMANCE



Primary and secondary packaging end of life performances are not provided due to the high number of involved countries for export distribution.

11. Environmental results Pesto alla Genovese without garlic - Italy

USE OF RESOURCES data referred to1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	9,23E+00	1,61E+00	9,44E-01	4,92E-03	2,41E-05	**1,18E+01**
	Used as raw materials*	0,00E+00	1,14E-01	0,00E+00	0,00E+00	0,00E+00	**1,14E-01**
	Total	**9,23E+00**	**1,72E+00**	**9,44E-01**	**4,92E-03**	**2,41E-05**	**1,19E+01**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	1,49E+01	1,20E+01	5,18E+00	1,87E+00	2,98E-03	**3,39E+01**
	Used as raw materials	0,00E+00	1,74E-01	0,00E+00	0,00E+00	0,00E+00	**1,74E-01**
	Total	**1,49E+01**	**1,22E+01**	**5,18E+00**	**1,87E+00**	**2,98E-03**	**3,41E+01**
Secondary Material (g)		0,00E+00	2,44E+02	0,00E+00	0,00E+00	0,00E+00	**2,44E+02**
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Non-renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Net use of fresh water (liters)		2,26E+02	1,62E+01	4,74E+00	9,32E-02	1,18E-03	**2,47E+02**

OUTPUT FLOWS data referret to1 kg of product	UPSTREAM		CORE	DOWNSTREAM		TOTAL
	Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
Waste to animal feed or similar (g)	0,00E+00	0,00E+00	5,51E+01	0,00E+00	0,00E+00	**5,51E+01**
Components for reuse (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Materials for recycling (g)	1,27E+00	8,21E+01	2,00E+02	1,69E+01	5,59E+02	**8,59E+02**
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	4,11E-03	3,90E-04	**4,50E-03**
Exported energy, electricity (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**
Exported energy, thermal (MJ)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**

Secondary energy resources and recovered energy flows do not show relevant contributions.

**The biomasses transformed into the product are not considered.*

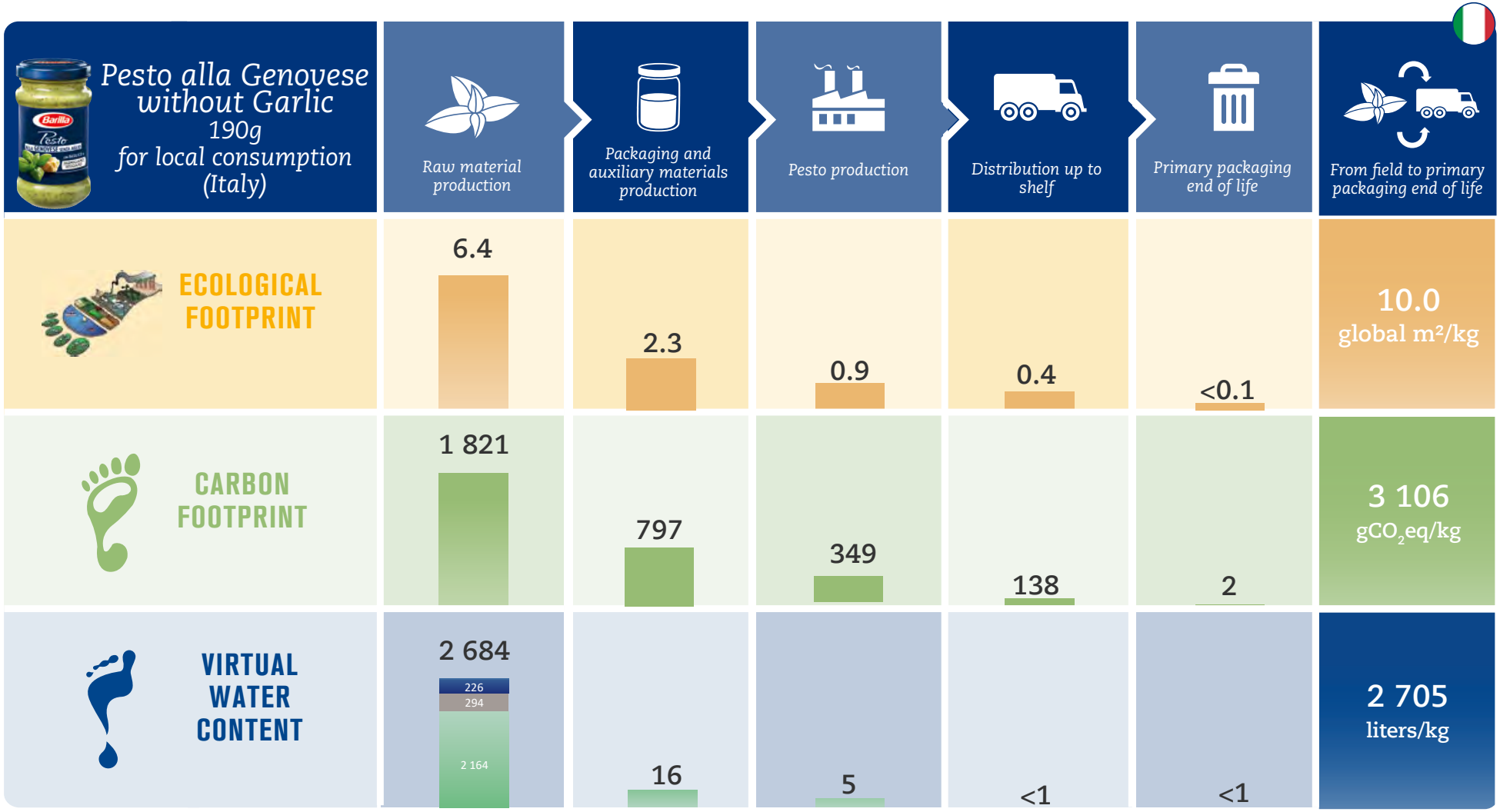
POTENTIAL ENVIRONMENTAL IMPACTS data referret to1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	1,42E+03	7,91E+02	3,43E+02	1,35E+02	3,90E-01	**2,69E+03**
	Biogenic	2,90E+02	4,17E+00	6,03E+00	2,67E+00	1,24E+00	**3,04E+02**
	Land use and land transformation	1,07E+02	1,64E+00	4,46E-03	2,47E-03	2,53E-05	**1,09E+02**
	Total	**1,82E+03**	**7,97E+02**	**3,49E+02**	**1,38E+02**	**1,63E+00**	**3,11E+03**
Acidification Potential - g SO_2 eq.		2,21E+01	3,99E+00	1,06E+00	6,92E-01	1,25E-03	**2,79E+01**
Eutrophication Potential - g PO_4^{---} eq.		1,18E+01	6,71E-01	2,27E-01	1,15E-01	1,09E-03	**1,28E+01**
Photochemical Oxidant Formation Potential - gNMVOC eq		5,53E+00	3,42E+00	1,30E+00	8,73E-01	2,06E-03	**1,11E+01**
Abiotic Depletion Potential - Elements g Sb eq.		1,07E-03	5,28E-03	3,87E-07	2,73E-07	3,27E-09	**6,35E-03**
Abiotic Depletion Potential - Fossil fuels - MJ, net calorific value		1,31E+01	1,17E+01	5,17E+00	1,86E+00	2,94E-03	**3,19E+01**
Water scarcity potential, m3 eq.		4,23E+01	3,32E+00	1,70E-01	3,84E-03	-6,52E-04	**4,58E+01**

WASTE PRODUCTION data referret to1 kg of product	UPSTREAM		CORE	DOWNSTREAM		TOTAL
	Raw material production	*Packaging and auxiliary materials production*	*Production*	*Distribution up to shelf*	*Primary packaging end of life*	
Hazardous waste disposed*	4,88E-03	1,20E+00	1,60E-02	0,00E+00	0,00E+00	**1,2E+00**
Non-Hazardous waste disposed*	1,37E+02	6,25E+00	6,53E+01	2,85E+00	1,72E+02	**3,8E+02**
Radioactive waste disposed	5,15E-01	4,18E-01	9,64E-02	6,80E-02	1,29E-04	**1,1E+00**

The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO_2 is equal to zero, since the absorbed amount is equal to the emitted biogenic CO_2 within the reference 100 years period.

** Only flows coming from processes under direct Barilla control were considered, flows generated by secondary data were excluded.*

PRODUCT ENVIRONMENTAL PERFORMANCE



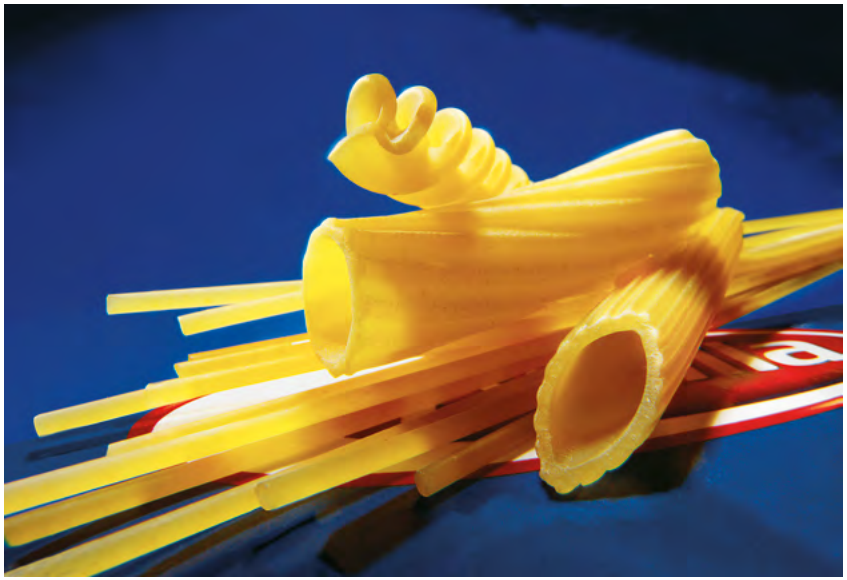
13. Differences versus previous versions of EPD

The differences versus previous EPD versions are due mainly to the use of updated emission factors for the energy mixes, updated packaging formats and updated recipes of the product. Moreover, new characterization factors and indicators were introduced, as a consequence of GPI update to 3.01 version.

14. Additional information

REFERENCES

- International EPD Consortium, General Programme Instructions (EPD), ver. 3.01 of 18/09/2019;
- WWF, Global Footprint Network, Zoological Society of London, Living Planet Report 2008, WWF (2008);
- Arjen Y. Hoekstra, Ashok K. Chapagain, Maite M. Aldaya, Mesfin M. Mekonnen; Water Footprint The Water Footprint Manual 2011, Waterfootprint Network;
- PCR 2010:19 CPC 23995: Sauces; ver. 3.12 of 01/09/2019;
- Venkat Kumar "Comparison of twelve organic and conventional farming system: a life cycle
- greenhouse gas emissions perspective" 2010, CleanMetrics Corp.
- P. Tsarouhas, et al., Life Cycle Assessment of olive oil production in Greece, Journal of Cleaner Production (2015)
- CONAI Report, relazione sulla gestione e Bilancio, 2018
- Eurostat database for waste management, latest version (2017)



Environmental declarations published within the same product category, though originating from different programs. may not be comparable. This declaration and further information in regards are available at www. environdec.com

As EPD owner, Barilla has the sole ownership, liability and responsibility for the EPD.

EPD PROCESS CERTIFICATION

Product category Rules (PCR) review conducted by:
Technical Committee of the International EPD® system.
Chair Filippo Sessa
Contact via info@environdec.com

Program operator:
EPD International AB
Box 210 60, SE-100 31 Stockholm, Sweden
info@environdec.com

EPD®
ENVIRONMENTAL PRODUCT DECLARATION

EPD PROCESS CERTIFICATION

Independent verification of the declaration and data, according to ISO 14025:

- [x] EPD process verification
- [ ] EPD verification- Third party verifier

PROCESS INTERNAL VERIFICATION

Procedure for follow-up of data during EPD validity involves third part verifier:

- [ ] Yes
- [x] No

Third party verifier: **Bureau Veritas Certification Sweden AB,** Accredited by: **SWEDAC**

BUREAU VERITAS

Process internal verifier: **Ugo Pretato,** Approved by: **The International EPD® System**

STUDIOFIESCHI & SOCI

CONTACTS

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For additional information relative to the activities of the Barilla Group or in regards to this environmental declaration, please contact:
Laura Marchelli - laura.marchelli@barilla.com

Barilla
The Italian Food Company. Since 1877.

Technical support and grafic design: **Life Cycle Engineering srl - Italy www.lcengineering.eu**

LCE

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15. Glossary

ECOLOGICAL FOOTPRINT

The ecological footprint measures the area of biologically productive land and water required to provide the resources used and absorb the carbon dioxide waste generated along the entire life cycle. It is measured in standard units called global hectares (gha).

www.globalfootprint.org

CARBON FOOTPRINT

A product carbon footprint is the total amount of greenhouse gases produced along the entire life cycle. It is expressed in equivalent mass of carbon dioxide (CO_2-eq).
In agriculture a significant contribution is given by the emission of nitrous oxide (N2O) due to the fertilizers use. It is also known as Global Warming Potential (GWP).

www.ipcc.ch

VIRTUAL WATER CONTENT

The virtual water content is the water both direct and indirect required to manufacture a product along its entire life cycle. Water footprint is defined as green water (evapotranspiration of water from plants). as blue water (directly used fresh surface and groundwater) and as grey water (the volume of water that is required to dilute pollutants so that the quality of the water remains above agreed quality standards).

www.waterfootprint.org

ACIDIFICATION (AP)

It is a phenomenon for which precipitation is unusually acidic, meaning that it has substandard levels of pH. It can have harmful effects on plants, aquatic animals and infrastructure. Acid rain is caused by emissions of SO_2. NO_x and NH_3. The acidification potential is measured in mass of sulphur dioxide equivalent (SO2-eq).

EUTROPHICATION (EP)

It is an abnormal proliferation of vegetation in the aquatic ecosystems caused by the addition of nutrients into rivers. lakes or ocean. which determinates a lack of oxygen. The eutrophication potential is mainly influenced by emission into water of phosphates and nitrates. It is expressed in mass of $PO_{4^{--}}$equivalent.

PHOTOCHEMICAL OXIDANT FORMATION POTENTIAL (POFP)

Production of compounds that, under the light effect, are able to promote an oxidation reaction leading to ozone production in the troposphere.
The indicator is mainly influenced by VOCs (Volatile organic compounds) is usually expressed in mass of ethylene equivalent (g NMVOC - equivalent).