



Arrabbiata sauce

Environmental Product Declaration



The first EPD process
certified in the Food
industries



Barilla
The Italian Food Company. Since 1877.



**REGISTRATION
NUMBER**

S-P-00493

CPC CODE

23995 Sauces
PCR 2010:19
v. 3.12 - 06.09.2019

PUBLICATION DATE

2015/09/01

REVISION

3 of 2020/06/01

VALID UNTIL

2025/05/31

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

Tomato sauces are produced in an owned plant located in Rubbiano (Italy), where the cooking process is very close to what people would do at home. The process starts from sauté vegetables in oil; tomato pulp is poured when vegetables are browned and herbs are added at the last moment.

After the cooking process, Arrabbiata sauce undergoes a heat treatment to pasteurize the product while preserving flavour 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 200 and 400 grams jar, both for local (Italian) and export market. The sauces sold in Italy and in the foreign countries have the same ingredients, but with slightly different recipes.

Sauce needs only to be heated up before the consumption.

THE PRODUCT



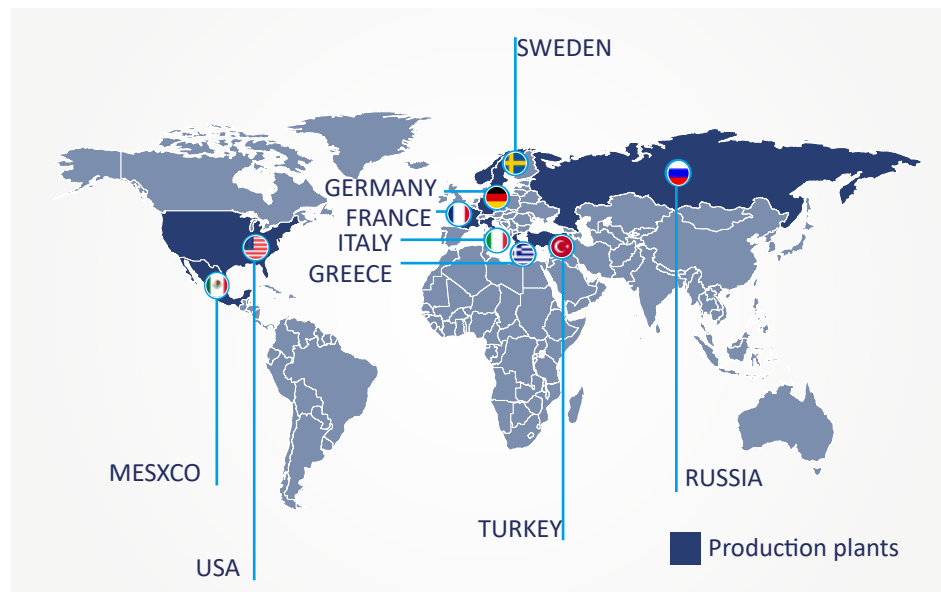
NUTRITIONAL INFORMATION (per 100 g)		
Energy	kcal	67
	kJ	282
Fats <i>of which saturated</i>	grams	3.2 0.3
Carbohydrates <i>of which sugars</i>	grams	7.4 5
Fibres	grams	1.3
Proteins	grams	1.6
Salt	grams	0.95

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

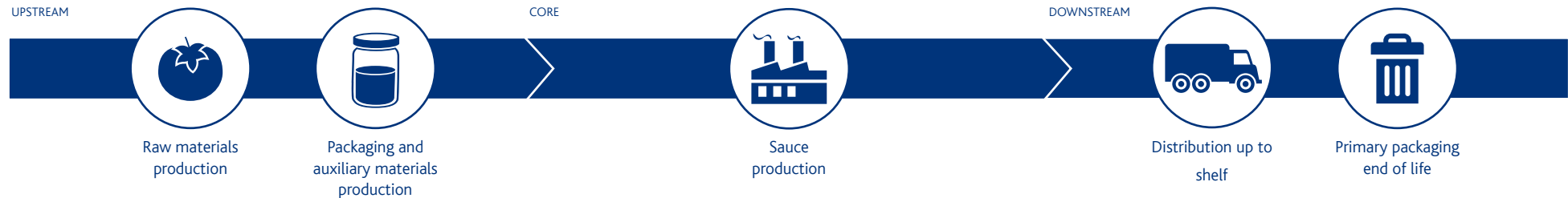
When he opened his store in 1877, Pietro Barilla's overriding aim was to make good food. Today, that principle has become Barilla's corporate mission: "Good for You, Good for the Planet".

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

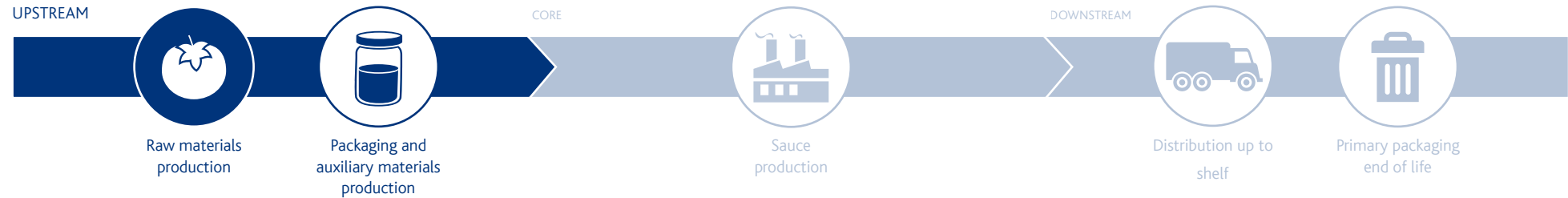
Data are referred to **1 kg** of product plus the related packaging (the packaging is referred to the **200 g** and the **400 g** formats, reported to 1 kg of product).

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



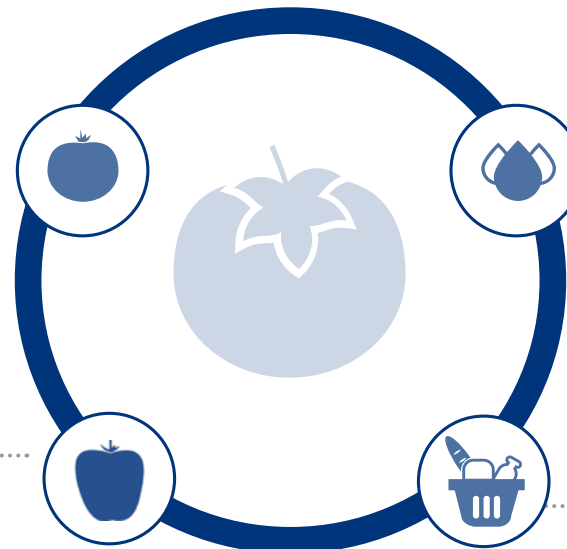
INGREDIENTS PRODUCTION

TOMATO

Impacts related to the tomatoes cultivation have been calculated on the basis of primary data (yields and fertilizer use) collected by farmers. The semifinished products are produced by suppliers, and the processes are modeled using primary data. Reference year 2018.

VEGETABLE

Pepper and onions data come from LCA database (Ecoinvent).



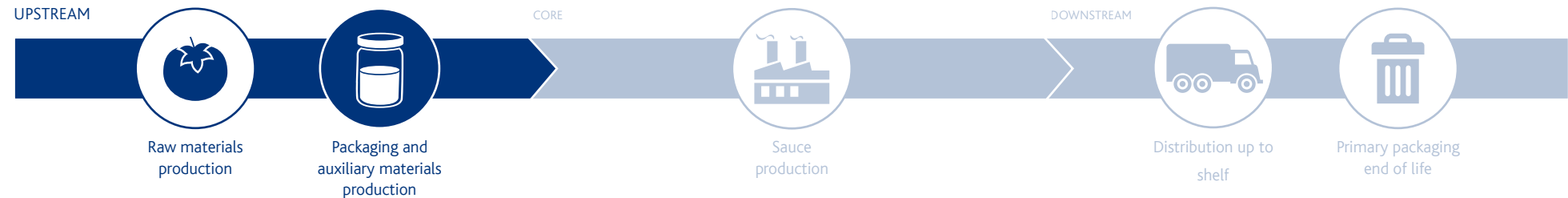
VEGETABLE OIL

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).

OTHER INGREDIENTS

Data related to the sugar come from Barilla suppliers; data related to other raw materials have been collected by LCA database (mainly Ecoinvent).

5. Packaging production



PACKAGING PRODUCTION

PRIMARY PACKAGING

Packaging environmental performances are calculated using the 200g and the 400g 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 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.

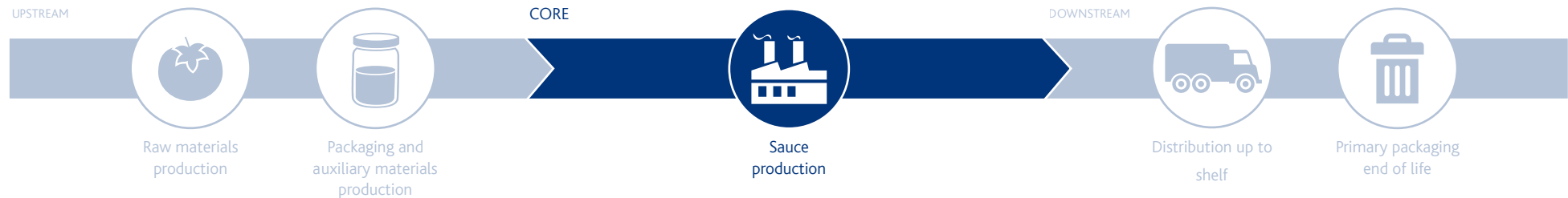


Since 2004, Barilla designs new packaging with the "LCA packaging design tool". It allows the assessment of the environmental impacts of the packaging solutions already during the design phase.

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).

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.

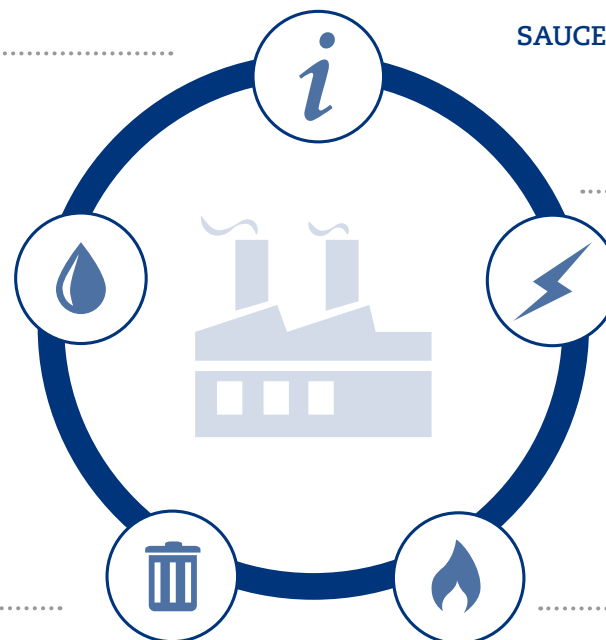
WATER

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.

SAUCE PRODUCTION



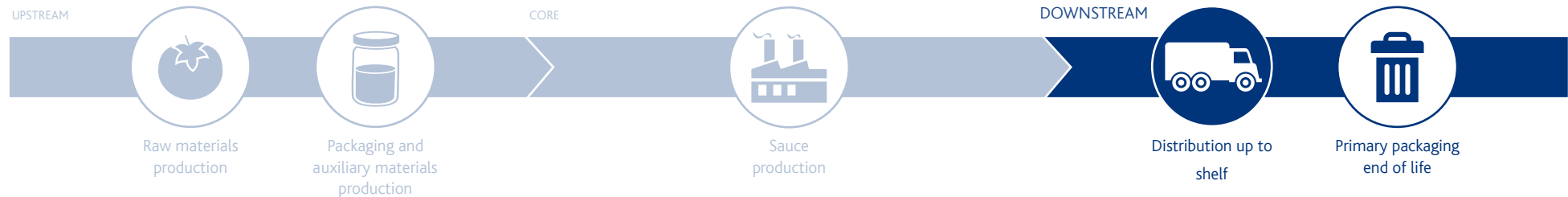
ELECTRICITY

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

Arrabbiata sauce is produced in Barilla's Rubbiano plant, Italy.

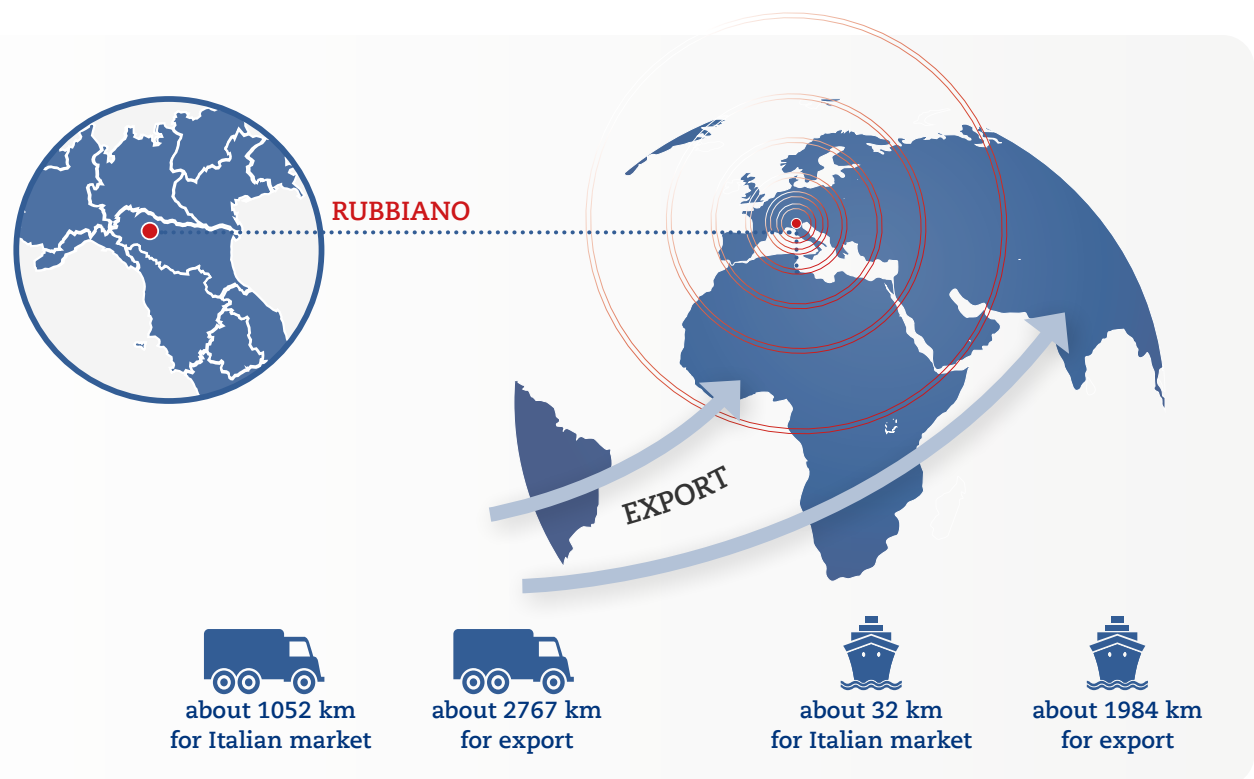
Distribution performance were calculated for the following hypotheses:

- 24% of production is intended for the Italian market
- 76% is intended for export

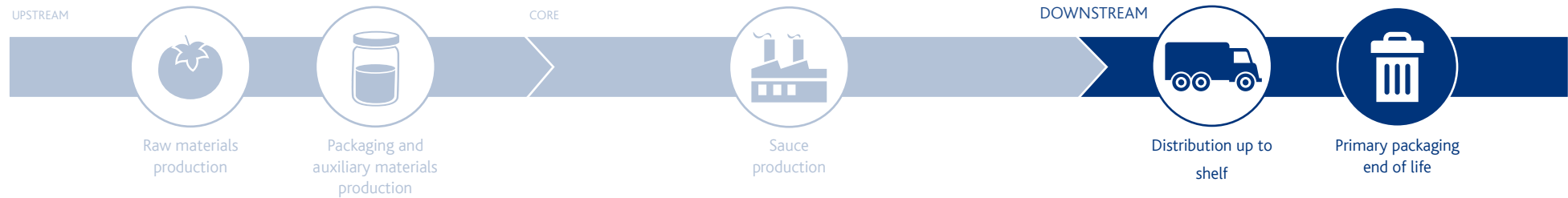
Distribution performance were calculated considering the transport for about 1052 km by truck in Italy and 2767 km by truck plus 1984 km by ship in other countries.

The product does not require special storage conditions (refrigeration, etc).

The impacts related to the packaging for transport end of life have been calculated only for local consumption considering the Italian scenario for paper/board (81% recycling, 8% energy recovery, 11% disposal) and plastic film (13% recycling, 71% energy recovery, 16% disposal).



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



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



Data elaborated from CONAI 2018 Report.

9. Environmental results - 200g jar, local consumption



USE OF RESOURCES data referred to 1 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	1,46E-01	1,50E+00	9,59E-01	9,11E-03	3,32E-05	2,61E+00
	Used as raw materials*	0,00E+00	1,00E-01	0,00E+00	0,00E+00	0,00E+00	1,00E-01
	Total	1,46E-01	1,60E+00	9,59E-01	9,11E-03	3,32E-05	2,71E+00
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	5,48E+00	1,14E+01	5,18E+00	3,48E+00	3,48E-03	2,56E+01
	Used as raw materials	0,00E+00	1,65E-01	0,00E+00	0,00E+00	0,00E+00	1,65E-01
	Total	5,48E+00	1,16E+01	5,18E+00	3,48E+00	3,48E-03	2,57E+01
Secondary Material (g)		0,00E+00	2,32E+02	0,00E+00	0,00E+00	0,00E+00	2,32E+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)		9,11E+01	1,54E+01	4,81E+00	1,71E-01	1,23E-03	1,12E+02
OUTPUT FLOWS data referred to 1 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)		1,44E-01	7,80E+01	2,03E+02	1,61E+01	4,97E+02	7,94E+02
Materials for energy recovery (g)		0,00E+00	0,00E+00	0,00E+00	3,91E-03	0,00E+00	3,91E-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.



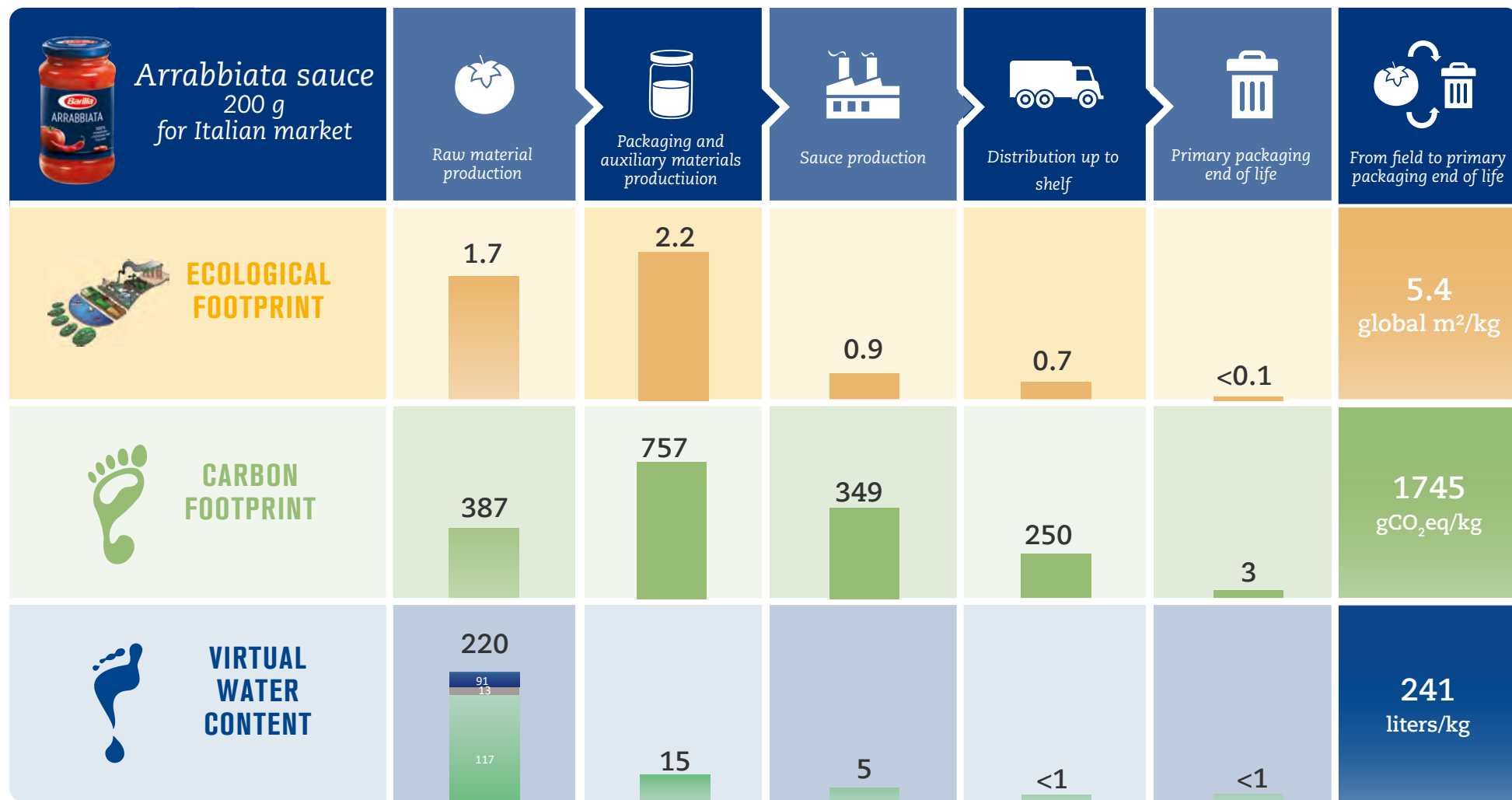
POTENTIAL ENVIRONMENTAL IMPACTS data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		 Raw material production	 Packaging and auxiliary materials production	 Production	 Distribution up to shelf	 Primary packaging end of life	
GLOBAL WARMING POTENTIAL - GWP (g CO ₂ eq)	Fossil	3,81E+02	7,51E+02	3,43E+02	2,47E+02	4,48E-01	1,72E+03
	Biogenic	4,48E-02	3,95E+00	6,13E+00	2,54E+00	2,09E+00	1,48E+01
	Land use and land transformation	5,64E+00	1,56E+00	4,41E-03	4,55E-03	3,63E-05	7,21E+00
	Total	3,87E+02	7,57E+02	3,49E+02	2,50E+02	2,54E+00	1,74E+03
Acidification Potential - g SO ₂ eq.		1,72E+00	3,79E+00	1,04E+00	1,03E+00	1,51E-03	7,58E+00
Eutrophication Potential - g PO ₄ ³⁻ eq.		1,41E+00	6,38E-01	2,25E-01	1,65E-01	1,59E-03	2,44E+00
Photochemical Oxidant Formation Potential - gNMVOC eq		1,14E+00	3,25E+00	1,28E+00	1,22E+00	2,60E-03	6,89E+00
Abiotic Depletion Potential - Elements g Sb eq.		1,30E-03	5,02E-03	3,81E-07	4,97E-07	3,44E-09	6,32E-03
Abiotic Depletion Potential - Fossil fuels - MJ, net calorific value		5,26E+00	1,12E+01	5,16E+00	3,46E+00	3,42E-03	2,51E+01
Water scarcity potential, m3 eq.		1,11E+01	3,09E+00	1,73E-01	7,08E-03	0,00E-04	1,44E+01
WASTE PRODUCTION data referred to 1 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*		1,76E-03	1,14E+00	1,63E-02	0,00E+00	0,00E+00	1,2E+00
Non-Hazardous waste disposed*		6,68E+00	5,93E+00	6,64E+01	2,71E+00	1,97E+02	2,8E+02
Radioactive waste disposed		1,40E-01	3,94E-01	9,48E-02	1,26E-01	1,59E-04	7,6E-01

The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO₂ is equal to zero, since the absorbed amount is equal to the emitted biogenic CO₂ 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





12. Environmental results - 200g jar, for export

USE OF RESOURCES data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	1,42E-01	1,50E+00	9,59E-01	2,74E-02	2,63E+00
	Used as raw materials*	0,00E+00	1,00E-01	0,00E+00	0,00E+00	1,00E-01
	Total	1,42E-01	1,60E+00	9,59E-01	2,74E-02	2,73E+00
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	5,19E+00	1,14E+01	5,15E+00	1,08E+01	3,25E+01
	Used as raw materials	0,00E+00	1,65E-01	0,00E+00	0,00E+00	1,65E-01
	Total	5,19E+00	1,16E+01	5,15E+00	1,08E+01	3,27E+01
Secondary Material (g)		0,00E+00	2,32E+02	0,00E+00	0,00E+00	2,32E+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)		8,28E+01	1,54E+01	4,81E+00	5,19E-01	1,04E+02
OUTPUT FLOWS data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
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)		1,65E-01	7,80E+01	2,03E+02	0,00E+00	2,81E+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 referred to 1 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	3,56E+02	7,51E+02	3,40E+02	7,56E+02	2,20E+03
	Biogenic	4,20E-02	3,95E+00	6,13E+00	6,06E-02	1,02E+01
	Land use and land transformation	5,60E+00	1,56E+00	4,37E-03	1,39E-02	7,18E+00
	Total	3,62E+02	7,57E+02	3,46E+02	7,56E+02	2,22E+03
Acidification Potential - g SO ₂ eq.		1,57E+00	3,79E+00	1,03E+00	3,96E+00	1,04E+01
Eutrophication Potential - g PO ₄ ⁻⁻⁻ eq.		1,27E+00	6,38E-01	2,23E-01	6,49E-01	2,78E+00
Photochemical Oxidant Formation Potential - gNMVOC eq		1,05E+00	3,25E+00	1,26E+00	4,86E+00	1,04E+01
Abiotic Depletion Potential - Elements g Sb eq.		1,19E-03	5,02E-03	3,77E-07	1,50E-06	6,22E-03
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		4,97E+00	1,12E+01	5,13E+00	1,07E+01	3,20E+01
Water scarcity potential. m3 eq.		1,01E+01	3,09E+00	1,73E-01	2,17E-02	1,34E+01
WASTE PRODUCTION data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
Hazardous waste disposed*		1,63E-03	1,14E+00	1,63E-02	0,00E+00	1,2E+00
Non-Hazardous waste disposed*		6,29E+00	5,93E+00	6,64E+01	0,00E+00	7,9E+01
Radioactive waste disposed		1,32E-01	3,94E-01	9,36E-02	3,91E-01	1,0E+00

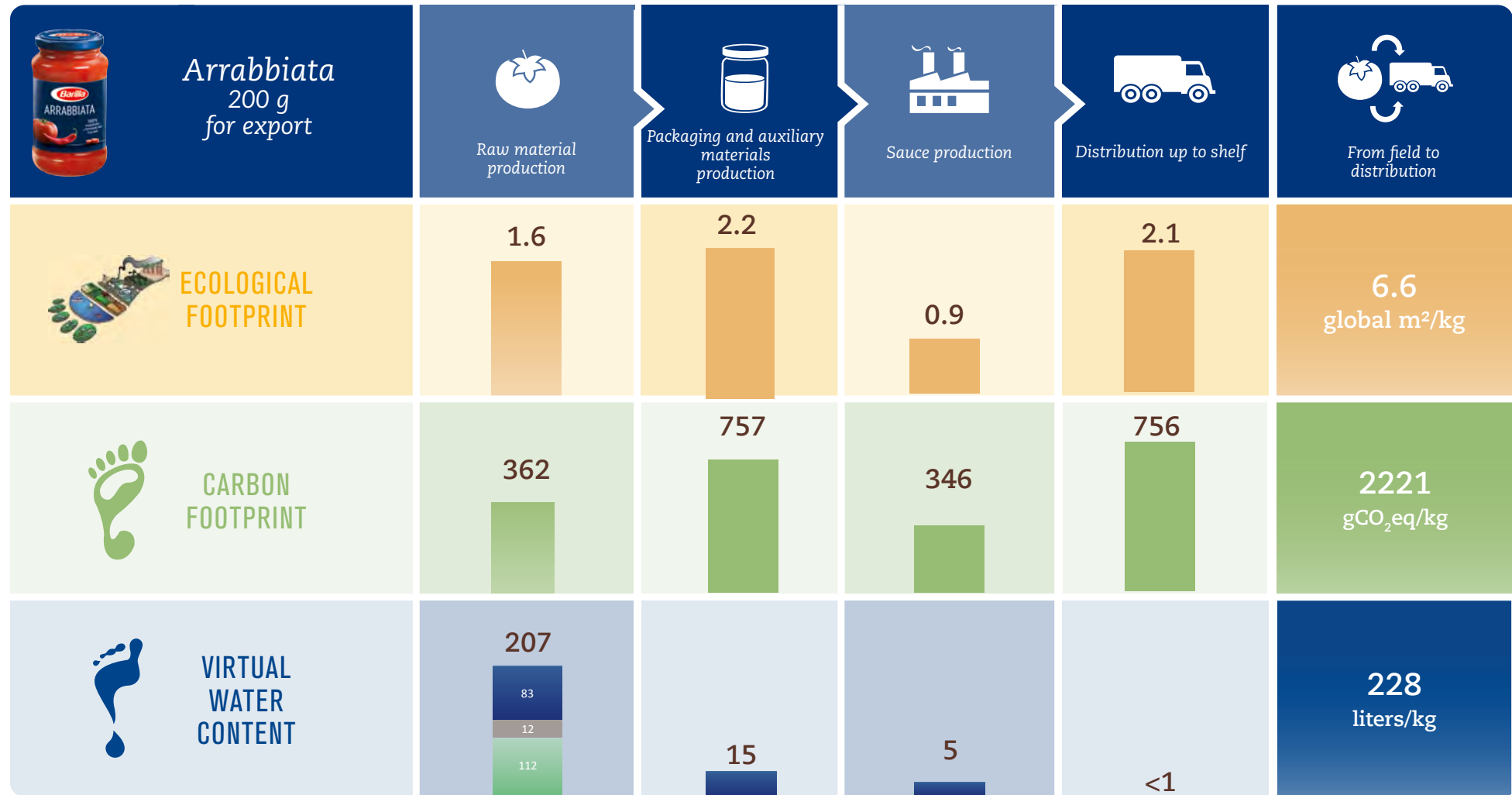
The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO₂ is equal to zero, since the absorbed amount is equal to the emitted biogenic CO₂ within the reference 100 years period.

* 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.

9. Environmental results - 400g jar, local consumption



USE OF RESOURCES data referred to 1 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	1,46E-01	1,16E+00	9,57E-01	8,23E-03	2,93E-05	2,27E+00
	Used as raw materials*	0,00E+00	8,43E-02	0,00E+00	0,00E+00	0,00E+00	8,43E-02
	Total	1,46E-01	1,24E+00	9,57E-01	8,23E-03	2,93E-05	2,35E+00
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	5,48E+00	8,62E+00	4,44E+00	3,15E+00	2,73E-03	2,17E+01
	Used as raw materials	0,00E+00	1,55E-01	0,00E+00	0,00E+00	0,00E+00	1,55E-01
	Total	5,48E+00	8,77E+00	4,44E+00	3,15E+00	2,73E-03	2,18E+01
Secondary Material (g)		0,00E+00	1,79E+02	0,00E+00	0,00E+00	0,00E+00	1,79E+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)		9,11E+01	8,81E+00	4,77E+00	1,54E-01	1,10E-03	1,05E+02
OUTPUT FLOWS data referred to 1 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)		1,44E-01	6,00E+01	2,03E+02	1,37E+01	3,80E+02	6,57E+02
Materials for energy recovery (g)		0,00E+00	0,00E+00	0,00E+00	3,54E-03	0,00E+00	3,54E-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.



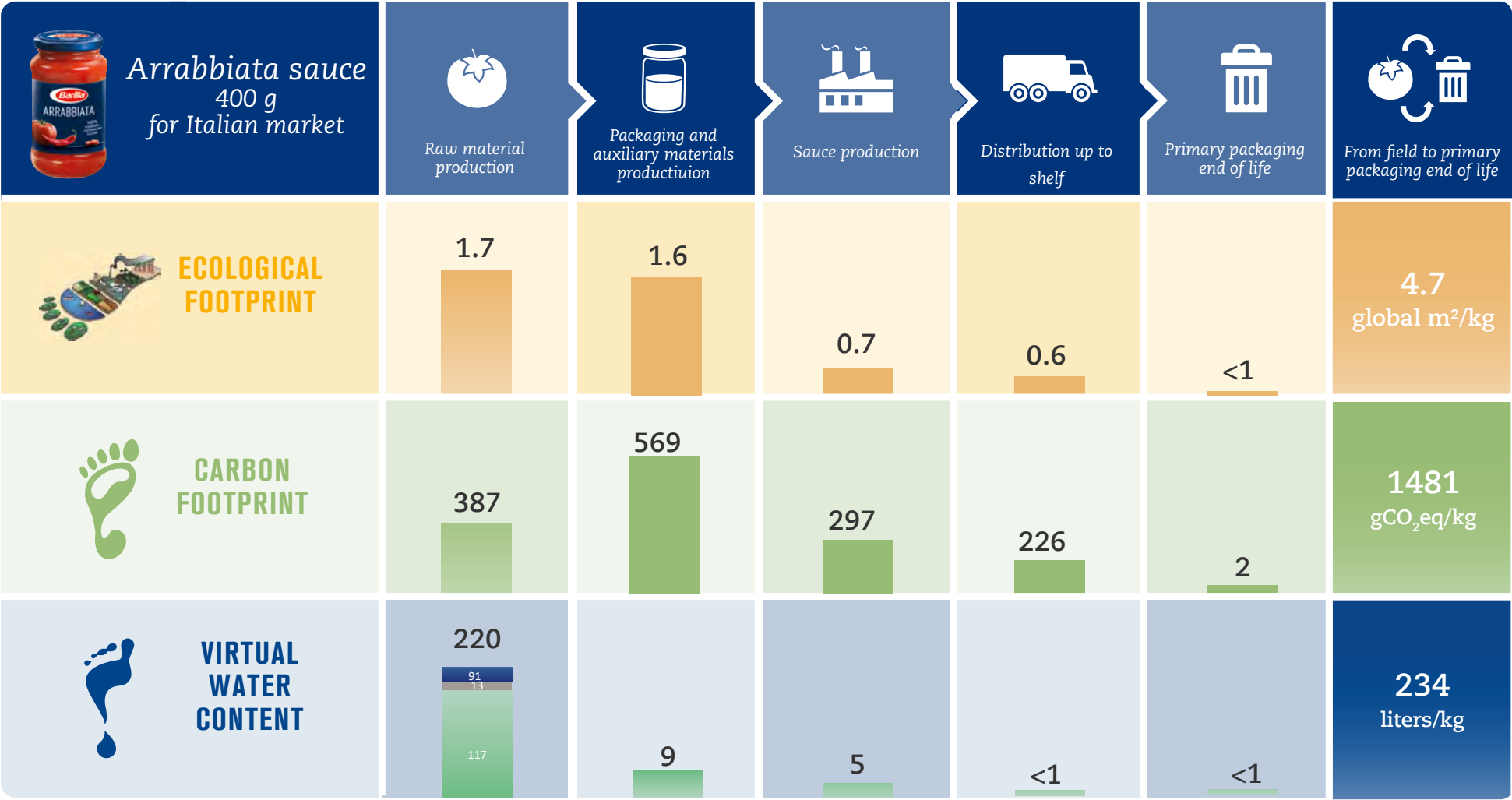
POTENTIAL ENVIRONMENTAL IMPACTS data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM		TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	Primary packaging end of life	
GLOBAL WARMING POTENTIAL - GWP (g CO ₂ eq)	Fossil	3,81E+02	5,65E+02	2,91E+02	2,24E+02	3,95E-01	1,46E+03
	Biogenic	4,48E-02	3,02E+00	6,12E+00	2,15E+00	1,85E+00	1,32E+01
	Land use and land transformation	5,64E+00	1,00E+00	3,45E-03	4,11E-03	3,22E-05	6,65E+00
	Total	3,87E+02	5,69E+02	2,97E+02	2,26E+02	2,24E+00	1,48E+03
Acidification Potential - g SO ₂ eq.		1,72E+00	2,83E+00	7,69E-01	9,32E-01	1,22E-03	6,25E+00
Eutrophication Potential - g PO ₄ ³⁻ eq.		1,41E+00	4,81E-01	1,80E-01	1,49E-01	1,42E-03	2,22E+00
Photochemical Oxidant Formation Potential - gNMVOC eq		1,14E+00	2,45E+00	9,33E-01	1,10E+00	2,12E-03	5,62E+00
Abiotic Depletion Potential - Elements g Sb eq.		1,30E-03	2,55E-03	2,78E-07	4,49E-07	3,04E-09	3,85E-03
Abiotic Depletion Potential - Fossil fuels - MJ, net calorific value		5,26E+00	8,48E+00	4,42E+00	3,13E+00	2,68E-03	2,13E+01
Water scarcity potential, m3 eq.		1,11E+01	2,62E+00	1,71E-01	6,40E-03	0,00E+00	1,39E+01
WASTE PRODUCTION data referred to 1 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*		1,76E-03	8,80E-01	1,63E-02	0,00E+00	0,00E+00	9,0E-01
Non-Hazardous waste disposed*		6,68E+00	4,16E+00	6,64E+01	2,35E+00	1,51E+02	2,3E+02
Radioactive waste disposed		1,40E-01	2,90E-01	6,79E-02	1,14E-01	1,31E-04	6,1E-01

The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO₂ is equal to zero, since the absorbed amount is equal to the emitted biogenic CO₂ 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





12. Environmental results - 400g jar, for export

USE OF RESOURCES data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	1,42E-01	1,16E+00	9,57E-01	2,48E-02	2,28E+00
	Used as raw materials*	0,00E+00	8,43E-02	0,00E+00	0,00E+00	8,43E-02
	Total	1,42E-01	1,24E+00	9,57E-01	2,48E-02	2,36E+00
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	5,19E+00	8,62E+00	4,41E+00	9,75E+00	2,80E+01
	Used as raw materials	0,00E+00	1,55E-01	0,00E+00	0,00E+00	1,55E-01
	Total	5,19E+00	8,77E+00	4,41E+00	9,75E+00	2,81E+01
Secondary Material (g)		0,00E+00	1,79E+02	0,00E+00	0,00E+00	1,79E+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)		8,28E+01	8,81E+00	4,77E+00	4,69E-01	9,69E+01
OUTPUT FLOWS data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
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)		1,65E-01	6,00E+01	2,03E+02	0,00E+00	2,63E+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 referred to 1 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	3,56E+02	5,65E+02	2,88E+02	6,84E+02	1,89E+03
	Biogenic	4,20E-02	3,02E+00	6,12E+00	5,48E-02	9,24E+00
	Land use and land transformation	5,60E+00	1,00E+00	3,41E-03	1,26E-02	6,62E+00
	Total	3,62E+02	5,69E+02	2,95E+02	6,84E+02	1,91E+03
Acidification Potential - g SO ₂ eq.		1,57E+00	2,83E+00	7,57E-01	3,58E+00	8,75E+00
Eutrophication Potential - g PO ₄ ³⁻ eq.		1,27E+00	4,81E-01	1,78E-01	5,87E-01	2,51E+00
Photochemical Oxidant Formation Potential - gNMVOC eq		1,05E+00	2,45E+00	9,17E-01	4,39E+00	8,82E+00
Abiotic Depletion Potential - Elements g Sb eq.		1,19E-03	2,55E-03	2,73E-07	1,36E-06	3,75E-03
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		4,97E+00	8,48E+00	4,39E+00	9,69E+00	2,75E+01
Water scarcity potential. m3 eq.		1,01E+01	2,62E+00	1,71E-01	1,96E-02	1,30E+01
WASTE PRODUCTION data referred to 1 kg of product		UPSTREAM		CORE	DOWNSTREAM	TOTAL
		Raw material production	Packaging and auxiliary materials production	Production	Distribution up to shelf	
Hazardous waste disposed*		1,63E-03	8,80E-01	1,63E-02	0,00E+00	9,0E-01
Non-Hazardous waste disposed*		6,29E+00	4,16E+00	6,64E+01	0,00E+00	7,7E+01
Radioactive waste disposed		1,32E-01	2,90E-01	6,66E-02	3,54E-01	8,4E-01

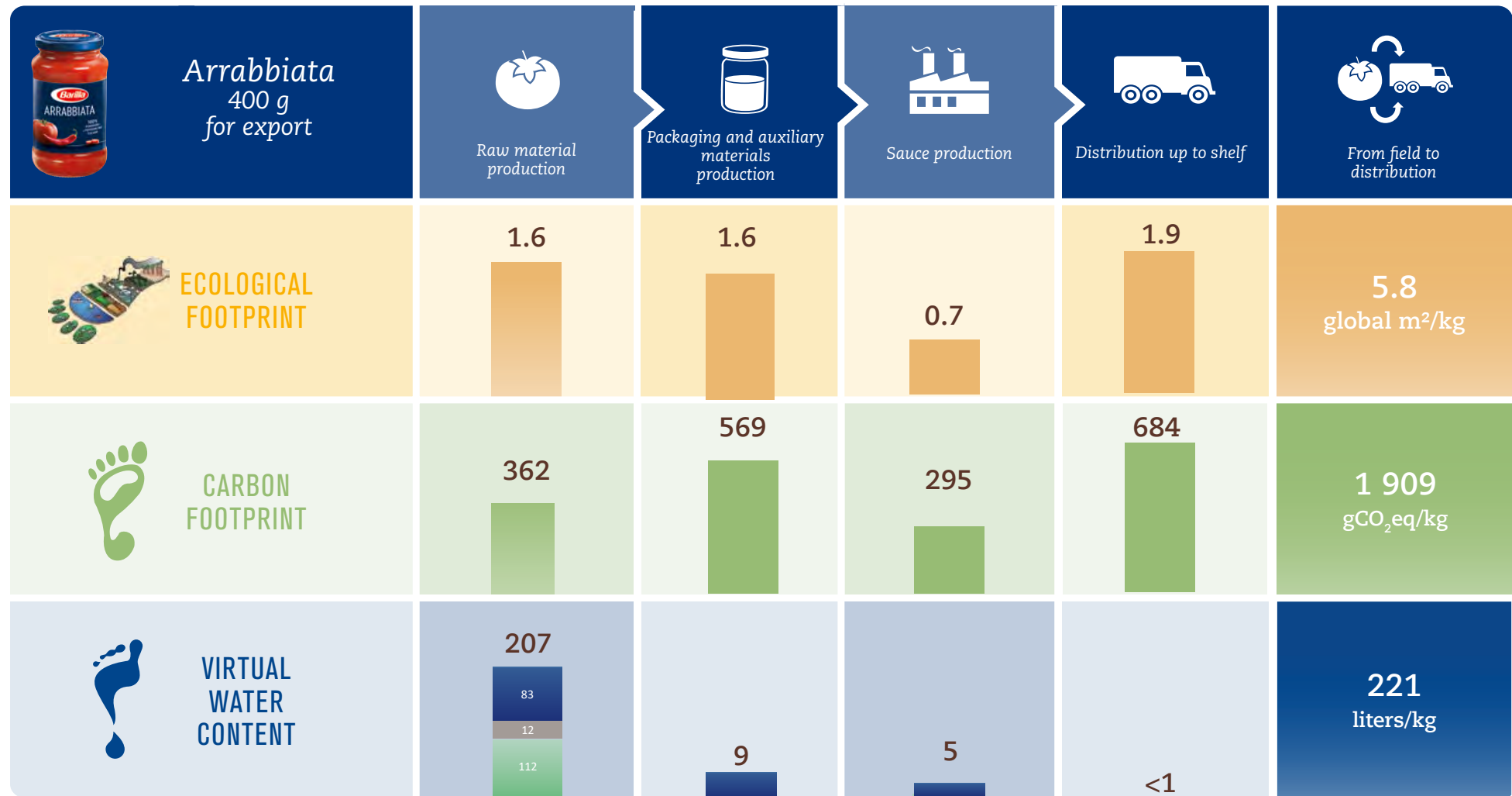
The biogenic contribution to Global Warming Potential refers only to biogenic methane.
The contribution given by biogenic CO₂ is equal to zero, since the absorbed amount is equal to the emitted biogenic CO₂ within the reference 100 years period.

* 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.

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;
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- 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 PROCESS CERTIFICATION

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

- ☒ 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
☒ No

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



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



CONTACTS

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



15. Glossary

ECOLOGICAL FOOTPRINT	CARBON FOOTPRINT	VIRTUAL WATER CONTENT	ACIDIFICATION (AP)	EUTROPHICATION (EP)	PHOTOCHEMICAL OXIDANT FORMATION POTENTIAL (POFP)
<p>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).</p>	<p>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 (CO₂-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).</p>	<p>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).</p>	<p>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 SO₂, NO_x and NH₃. The acidification potential is measured in mass of sulphur dioxide equivalent (SO₂-eq).</p>	<p>It is an abnormal proliferation of vegetation in the aquatic ecosystems caused by the addition of nutrients into rivers, lakes or ocean, which determines a lack of oxygen. The eutrophication potential is mainly influenced by emission into water of phosphates and nitrates. It is expressed in mass of PO₄⁻-equivalent.</p>	<p>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).</p>
www.globalfootprint.org	www.ipcc.ch	www.waterfootprint.org			