
# Ragù alla Bolognese sauce

## Environmental Product Declaration

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-02175

**CPC CODE**
23995 Sauces
PCR 2010:19
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**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 Barilla brand has its roots in a small bread and pasta store opened in Parma in 1877. Today it is the number one pasta in Italy and around the world. Thanks to the best durum wheat and impressive modern technologies, Barilla supplies millions around the world with pasta that always cooks to a perfect al dente texture, as well as ready-to-eat pasta sauces.

Further information on **Barilla** website.

## THE PLANT AND THE PROCESS

Ragù alla Bolognese sauce is 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 and meat are poured when vegetables are browned and herbs are added at the last moment.
After the cooking process, the 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 400 grams jar, both for local (Italian) and export market (worldwide). The sauces sold in Italy and in the foreign countries have the same ingredients.
Sauce needs only to be heated up before the consumption.

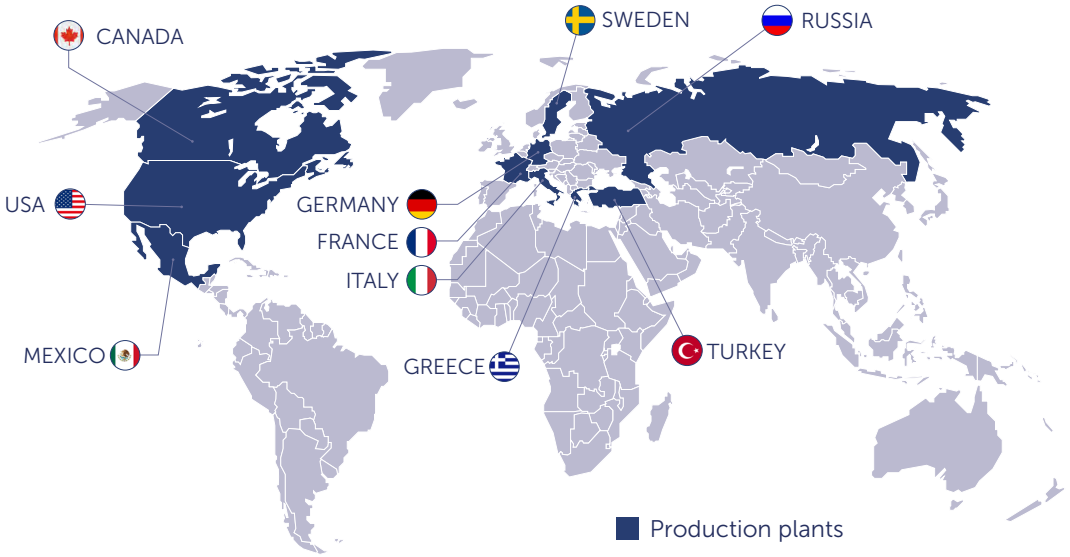
## THE PRODUCT


| NUTRITIONAL INFORMATION (per 100 g) | | |
|---|---|---|
| Energy | kcal<br>kJ | 78<br>324 |
| Fats<br>*of which saturated* | grams | 4.0<br>*1.2* |
| Carbohydrates<br>*of which sugars* | grams | 4.5<br>*4.0* |
| Fibres | grams | 1.8 |
| Proteins | grams | 5.0 |
| Salt | grams | 1.0 |

# 2. Barilla group

Passion for quality, continuous pursuit of excellent recipes and ability to combine tradition and innovation are the fundamental ingredients that that have allowed a small shop of bread and pasta, opened in 1877 in Parma, to become an international player in the market of pasta, ready-to-eat sauces, baked goods and crispy breads.
The Group operates in over 100 countries through its brands, which have become the icon of excellence in the food sector, and with 30 production sites, which every year contribute to the production of over 2,099,000 tonnes of products.
With its brands - Barilla, Mulino Bianco, Pan di Stelle, Gran Cereale, Harrys, Pavesi, Wasa, Filiz, Yemina e Vesta, Misko, Voiello, Cucina Barilla, Catelli, Lancia, Tolerant and Pasta Evangelists – promotes a tasty, joyful and healthy diet, inspired by the Mediterranean diet and the Italian lifestyle.

Further information on www.barillagroup.com




## Good for You, Good for the Planet

*In order to make a concrete contribution to global challenges, over the years, Barilla has developed a thought enclosed in the Good for You, Good for the Planet Mission that guides, step by step and offers people good, safe, nutritionally balanced food, coming from responsible supply chains.*

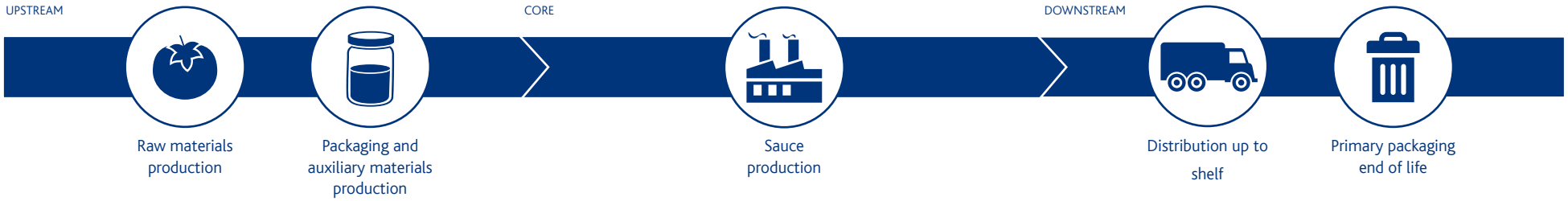
*GOOD FOOD means taste, pleasure and a daily gesture of love for the people themselves.*

*HEALTHY FOOD means selected raw materials and balanced nutritional profiles to support healthy lifestyles.*

*FOOD SOURCED FROM RESPONSIBLE SUPPLY CHAINS means seeking the best ingredients to guarantee excellent quality, respectful of people, animals and the environment.*

*A commitment "from field to fork", which has led to the development of initiatives in the various stages of the supply chain and for which all Barilla Group brands contribute through projects aiming to improve the nutritional profile of products, reinforce the sustainability of the production and supply chains and provide transparent communication to consumers.*

# 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 shelf.
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 **400 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


### TOMATO

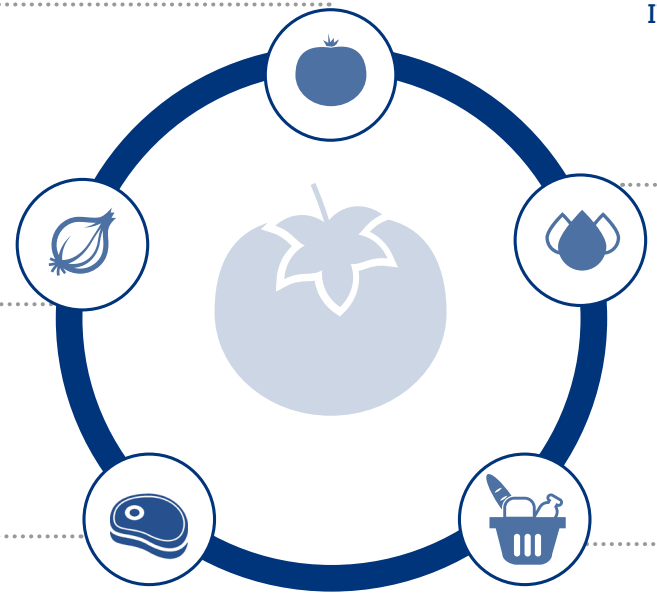
Impacts related to the tomatoes cultivation have been calculated on the basis of primary data (yields and fertilizer use) collected by farmers.
The semifinished products are produced by suppliers, and the processes are modelized using primary data. Reference year 2018.

### VEGETABLE

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

### MEAT

Impacts related to meat production have been calculated on the basis of Beef meat EPD published by Montana and LCA database (mainly Ecoinvent) for pork producion.



### INGREDIENTS PRODUCTION

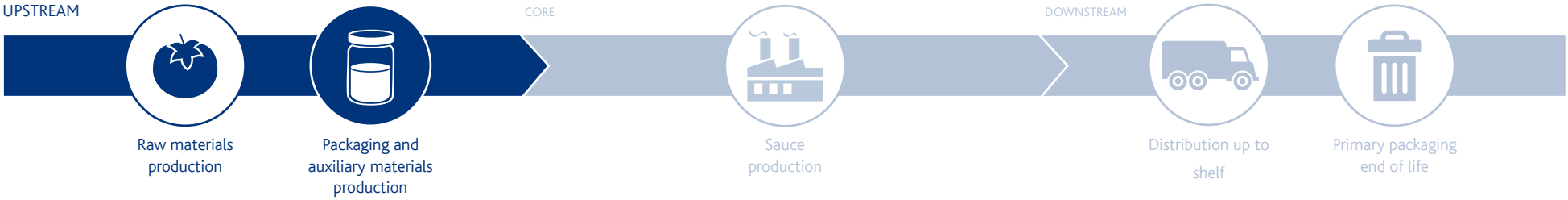
### VEGETABLE OIL

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



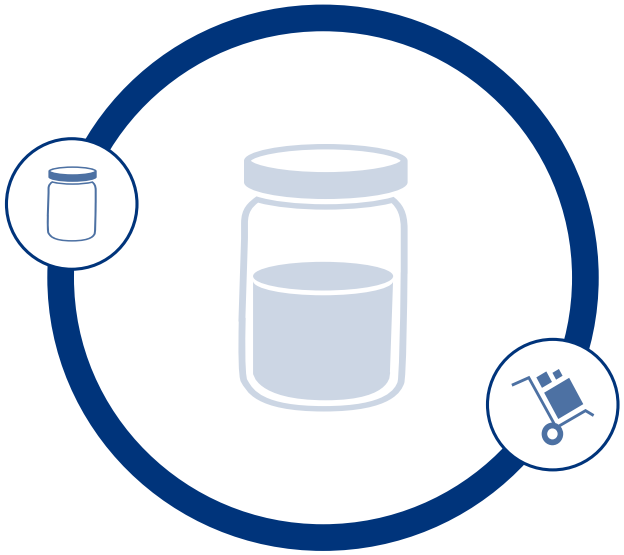

## PACKAGING PRODUCTION

*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.*

### PRIMARY PACKAGING

Packaging environmental performances are calculated using the 400g format 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.

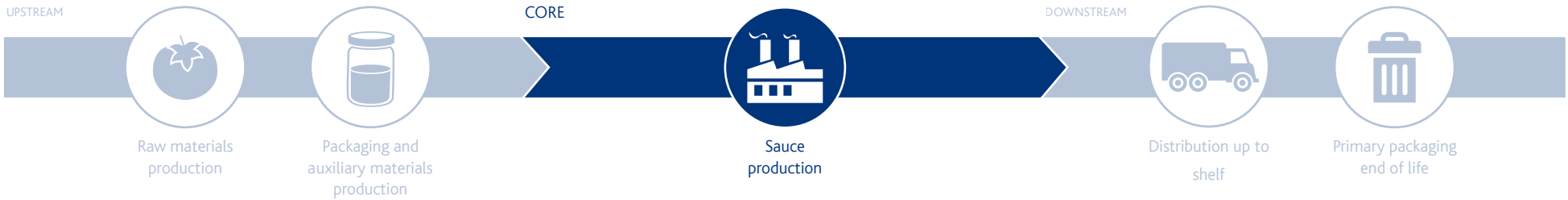


### PACKAGING FOR TRANSPORTATION

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).

Auxiliary materials environmental performances are evaluated by using primary data from plant, during 2020 year.
Secondary data (Ecoinvent) are used for environmental aspects associated to materials production.

# 6. Sauce production




## GENERAL INFORMATION

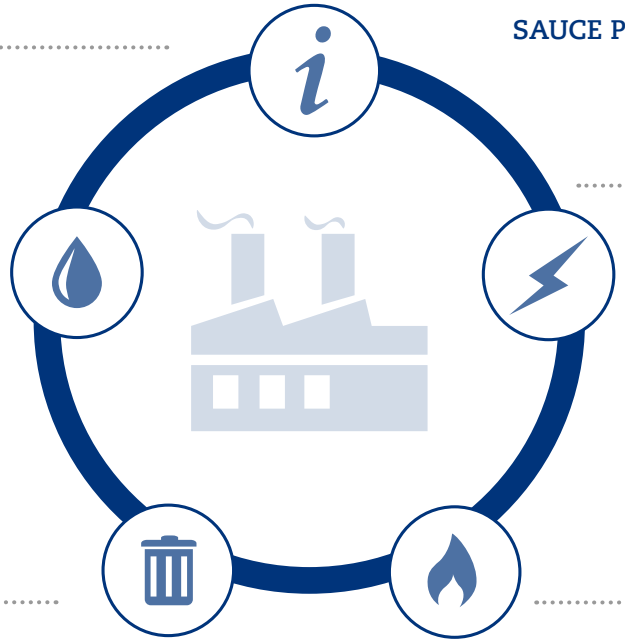
The environmental performance related to production processes is evaluated by considering the energy and the water consumption and the waste production as primary data. Secondary data (mainly Ecoinvent) are used for the environmental aspects related to the production of energy and water.

## 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 2020.

## 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 2020.



## SAUCE PRODUCTION

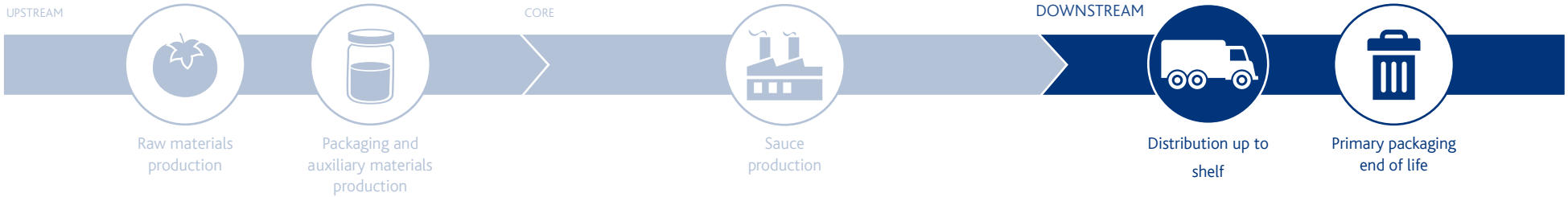
## ELECTRICITY

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 2020.

## 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 2020.

# 7. Distribution




## DISTRIBUTION

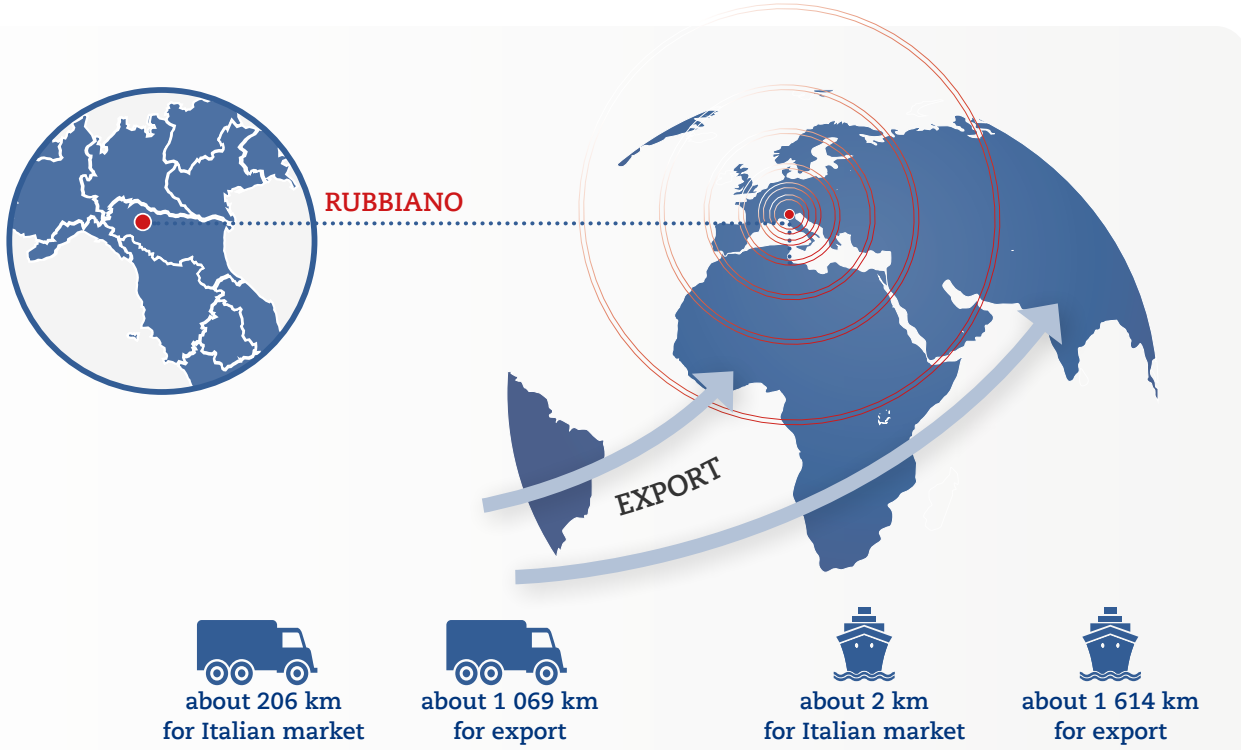
Ragù alla Bolognese sauce is produced in Barilla's Rubbiano plant, Italy.

Distribution performance were calculated for the following hypotheses:

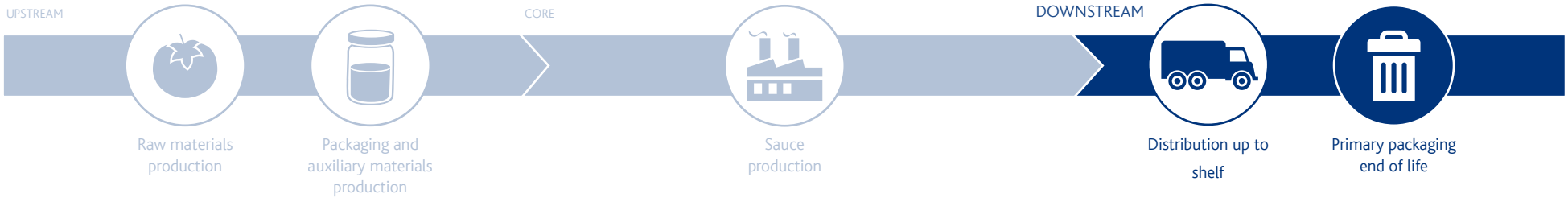
- 28% of production is intended for the Italian market
- 72% is intended for export (worldwide).

Distribution performance was calculated considering the transport by truck for about 206 km in Italy and 1 069 km in other countries, plus the transport by ship for about 2 km in Italy and 1 614 km 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 (29% recycling, 61% energy recovery, 11% landfilling).



# 8. Primary packaging end of life





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

**77%** RECYCLE

Avoiding the production of virgin glass.

**23%** DISPOSAL

In Italy, 17% of waste sent to disposal are incinerated without energy recovery, the remaining part goes to landfill

GL 70 VASETTO VETRO Raccolta VETRO

**82%** RECYCLE

Avoiding the ore mining.

**18%** DISPOSAL

In Italy, 17% 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 - local consumption

| USE OF RESOURCES<br>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 | 1.03E+01 | 1.50E+00 | 8.26E-01 | 3.39E-03 | 1.38E-04 | **1.26E+01** |
| | Used as raw materials* | 0.00E+00 | 2.82E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **2.82E-01** |
| | **Total** | **1.03E+01** | **1.78E+00** | **8.26E-01** | **3.39E-03** | **1.38E-04** | 1.29E+01 |
| **PRIMARY ENERGY RESOURCES - NON RENEWABLE** data in MJ | Used as energy carrier | 1.60E+01 | 8.83E+00 | 3.71E+00 | 7.22E-01 | 7.75E-03 | **2.93E+01** |
| | Used as raw materials | 0.00E+00 | 3.28E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **3.28E+00** |
| | **Total** | **1.60E+01** | **1.21E+01** | **3.71E+00** | **7.22E-01** | **7.75E-03** | 3.25E+01 |
| Secondary Material (g) | | 0.00E+00 | 2.74E+02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **2.74E+02** |
| Renewable secondary fuels (MJ. net calorific power) | | 0.00E+00 | 6.48E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **6.48E-02** |
| 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) | | 3.99E+02 | 1.34E+01 | 4.25E+00 | 2.05E-01 | 9.58E-03 | **4.17E+02** |

| OUTPUT FLOWS<br>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* | |
| Waste to animal feed or similar (g) | 0.00E+00 | 0.00E+00 | 3.53E+01 | 0.00E+00 | 0.00E+00 | **3.53E+01** |
| Components for reuse (g) | 4.40E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **4.40E+00** |
| Materials for recycling (g) | 2.30E+00 | 7.50E+01 | 1.31E+02 | 8.79E+01 | 4.08E+02 | **7.04E+02** |
| Materials for energy recovery (g) | 0.00E+00 | 0.00E+00 | 1.00E+00 | 2.18E+01 | 5.12E+00 | **2.79E+01** |
| 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<br>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* | |
| **GLOBAL WARMING POTENTIAL - GWP** ($g\ CO_2$ eq) | Fossil | 1.66E+03 | 7.05E+02 | 2.39E+02 | 1.30E+02 | 3.53E+00 | **2.74E+03** |
| | Biogenic | 1.14E+03 | 4.59E+00 | 5.97E+00 | 8.94E+01 | 3.00E+00 | **1.24E+03** |
| | Land use and land transformation | 4.30E+02 | 1.55E+01 | 3.37E-03 | 3.11E-03 | 1.09E-04 | **4.45E+02** |
| | **Total** | **3.23E+03** | **7.25E+02** | **2.45E+02** | **2.19E+02** | **6.53E+00** | **4.43E+03** |
| Acidification Potential - g $SO_2$ eq. | | 1.13E+02 | 3.36E+00 | 6.10E-01 | 3.11E-01 | 5.53E-03 | **1.17E+02** |
| Eutrophication Potential - g $PO_4^{---}$ eq. | | 3.26E+01 | 8.87E-01 | 1.57E-01 | 1.33E-01 | 3.74E-03 | **3.37E+01** |
| Photochemical Oxidant Formation Potential - gNMVOC eq | | 1.92E+01 | 2.99E+00 | 7.43E-01 | 4.10E-01 | 8.27E-03 | **2.33E+01** |
| Abiotic Depletion Potential - Elements g Sb eq. | | 2.56E-03 | 2.44E-02 | 6.97E-06 | 1.51E-05 | 6.77E-07 | **2.70E-02** |
| Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value | | 1.32E+01 | 1.15E+01 | 3.70E+00 | 7.17E-01 | 7.59E-03 | **2.92E+01** |
| Water scarcity potential. m3 eq. | | 2.79E+01 | 1.73E+00 | 1.35E-01 | 4.72E-03 | -9.37E-05 | **2.98E+01** |

| WASTE PRODUCTION<br>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* | |
| Hazardous waste disposed | 4.42E-02 | 7.70E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **4.4E-02** |
| Non-Hazardous waste disposed | 1.24E+01 | 1.48E+01 | 0.00E+00 | 1.40E+01 | 1.23E+02 | **1.6E+02** |
| Radioactive waste disposed | 2.74E-02 | 1.50E-02 | 9.40E-03 | 5.11E-03 | 4.60E-05 | **5.7E-02** |

*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.*

## PRODUCT ENVIRONMENTAL PERFORMANCE

|  *Ragù alla Bolognese sauce for Italian market* | *Raw material production* | *Packaging and auxiliary materials productiuion* | *Sauce production* | *Distribution up to shelf* | *Primary packaging end of life* | *From field to primary packaging end of life* |
|---|---|---|---|---|---|---|
|  **ECOLOGICAL FOOTPRINT** | 7.5 | 2.3 | 0.6 | 0.6 | <0.1 | 11.1 global m²/kg |
| **CARBON FOOTPRINT** | 3 235 | 725 | 245 | 219 | 7 | 4 431 $gCO_2eq/kg$ |
| **WATER SCARCITY** | 27 950 | 1 726 | 135 | 5 | 0.1 | 29 816 litres eq/kg |

*Compared to the last EPD, in this section the Water Scarcity indicator has substituted the Virtual Water Content, previously reported, to improve coherence with the indicators section.*

# 10. Environmental results - export distribution

| 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 ENERGY RESOURCES - RENEWABLE data in MJ | Used as energy carrier | 1.03E+01 | 1.50E+00 | 8.26E-01 | 5.28E-03 | **1.26E+01** |
| | Used as raw materials* | 0.00E+00 | 2.82E-01 | 0.00E+00 | 0.00E+00 | **2.82E-01** |
| | **Total** | **1.03E+01** | **1.78E+00** | **8.26E-01** | **5.28E-03** | **1.29E+01** |
| PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ | Used as energy carrier | 1.60E+01 | 8.83E+00 | 3.71E+00 | 3.70E+00 | **3.22E+01** |
| | Used as raw materials | 0.00E+00 | 3.28E+00 | 0.00E+00 | 0.00E+00 | **3.28E+00** |
| | **Total** | **1.60E+01** | **1.21E+01** | **3.71E+00** | **3.70E+00** | **3.55E+01** |
| Secondary Material (g) | | 0.00E+00 | 2.74E+02 | 0.00E+00 | 0.00E+00 | **2.74E+02** |
| Renewable secondary fuels (MJ. net calorific power) | | 0.00E+00 | 6.48E-02 | 0.00E+00 | 0.00E+00 | **6.48E-02** |
| 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) | | 3.99E+02 | 1.34E+01 | 4.25E+00 | 1.56E-01 | **4.16E+02** |

| OUTPUT FLOWS data referred to1 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 | 3.53E+01 | 0.00E+00 | **3.53E+01** |
| Components for reuse (g) | 4.40E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | **4.40E+00** |
| Materials for recycling (g) | 2.30E+00 | 7.50E+01 | 1.31E+02 | 0.00E+00 | **2.09E+02** |
| Materials for energy recovery (g) | 0.00E+00 | 0.00E+00 | 1.00E+00 | 0.00E+00 | **1.00E+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.*

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

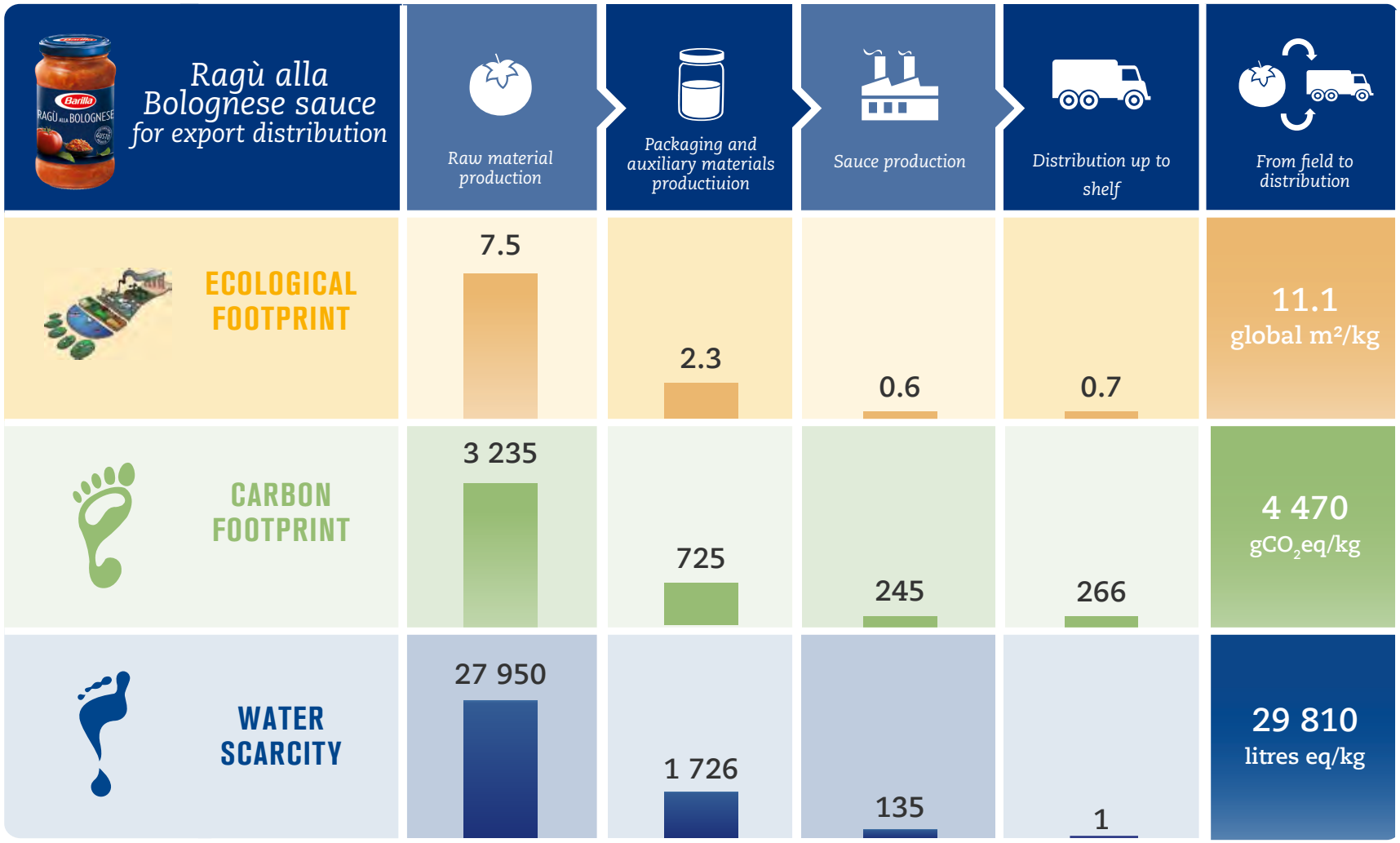
| POTENTIAL ENVIRONMENTAL IMPACTS<br>data referred to1 kg of product | | UPSTREAM | | CORE | DOWNSTREAM | TOTAL |
|---|---|---|---|---|---|---|
| | | *Raw material production* | *Packaging and auxiliary materials production* | *Production* | *Distribution up to shelf* | |
| **GLOBAL WARMING POTENTIAL - GWP** ($g\ CO_2$ eq) | Fossil | 1.66E+03 | 7.05E+02 | 2.39E+02 | 2.66E+02 | **2.87E+03** |
| | Biogenic | 1.14E+03 | 4.59E+00 | 5.97E+00 | 1.39E-02 | **1.15E+03** |
| | Land use and land transformation | 4.30E+02 | 1.55E+01 | 3.37E-03 | 2.28E-03 | **4.45E+02** |
| | **Total** | **3.23E+03** | **7.25E+02** | **2.45E+02** | **2.66E+02** | **4.47E+03** |
| Acidification Potential - g $SO_2$ eq. | | 1.13E+02 | 3.36E+00 | 6.10E-01 | 1.88E+00 | **1.19E+02** |
| Eutrophication Potential - g $PO_4^{---}$ eq. | | 3.26E+01 | 8.87E-01 | 1.57E-01 | 2.60E-01 | **3.39E+01** |
| Photochemical Oxidant Formation Potential - gNMVOC eq | | 1.92E+01 | 2.99E+00 | 7.43E-01 | 2.05E+00 | **2.50E+01** |
| Abiotic Depletion Potential - Elements g Sb eq. | | 2.56E-03 | 2.44E-02 | 6.97E-06 | 1.50E-05 | **2.70E-02** |
| Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value | | 1.32E+01 | 1.15E+01 | 3.70E+00 | 3.69E+00 | **3.21E+01** |
| Water scarcity potential. m3 eq. | | 2.79E+01 | 1.73E+00 | 1.35E-01 | -8.65E-04 | **2.98E+01** |

| WASTE PRODUCTION<br>data referred to1 kg of product | UPSTREAM | | CORE | DOWNSTREAM | TOTAL |
|---|---|---|---|---|---|
| | *Raw material production* | *Packaging and auxiliary materials production* | *Production* | *Distribution up to shelf* | |
| Hazardous waste disposed | 4.42E-02 | 7.70E-09 | 0.00E+00 | 0.00E+00 | **4.4E-02** |
| Non-Hazardous waste disposed | 1.24E+01 | 1.48E+01 | 0.00E+00 | 0.00E+00 | **2.7E+01** |
| Radioactive waste disposed | 2.74E-02 | 1.50E-02 | 9.42E-03 | 2.75E-02 | **7.9E-02** |

*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.*

*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.*

*Compared to the last EPD, in this section the Water Scarcity indicator has substituted the Virtual Water Content, previously reported, to improve coherence with the indicators section.*

# 11. 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);
- 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.
- CONAI Report, relazione sulla gestione e Bilancio, 2019


*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 Gorka Benito Alonso
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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# 12. 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

## WATER SCARCITY

Water scarcity measures the available water remaining per unit of surface in a given watershed relative to the world average, after human and aquatic ecosystem demands have been met. This method builds on the assumption that the potential to deprive another user of water is directly proportional to the amount of water consumed and inversely proportional to the available water remaining per unit of surface and time in a region (watershed).

www.wulca-waterlca.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 VOCs equivalent (g NMVOC - equivalent).