Dry semolina pasta Selezione Oro Chef

Environmental Product Declaration

1 EPD PROCESS

The first EPD process certified in the Food industries

Barilla
The Italian Food Company. Since 1877.

EPD®
ENVIRONMENTAL PRODUCT DECLARATION

REGISTRATION NUMBER	CPC CODE	PUBLICATION DATE	REVISION	VALID UNTIL	PROGRAMME	PROGRAMME OPERATOR
S-P-00492	2731 Uncooked pasta, not stuffed or otherwise prepared PCR 2010:01 v. 4.01 20.09.2021	2014/09/22	7 of 2021/12/22 (editorial update 2023/09/07)	2024/12/29	The International EPD® System www.environdec.com	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 is born in 1877 as a small bread and pasta shop in Parma. The best durum wheat and cutting-edge technologies make it possible to offer pasta that always remains "al dente" and ready-made sauces to millions of people around the world.

Barilla For Professionals is a line of product for professional use designed to make the work of **HoReCa Sector professionals** easier and to enable people to enjoy the quality of Barilla products when they are **eating away from home** too.

Further information on *Barilla for Professionals website*.

THE PLANT AND THE PROCESS

This Environmental Product Declaration is about Barilla's pasta Selezione Oro Chef produced in three Italian plants (Pedrignano, Foggia and Marcianise) and sold in Italy and worldwide.
Dry semolina pasta Selezione Oro Chef is made from only water and special quality durum wheat, with final moisture content below 13%, as prescribed by Italian legislation on pasta. It is produced by extrusion or lamination and then a drying process.
The pasta production process does not require additives and preservatives: it is the drying process that guarantees the conservation.

THE PRODUCTS

The new Selezione Oro Chef has a new blend of selected quality durum wheat and a 14% protein content, for a robust texture and elasticity in all professional kitchens. With its strong cooking tolerance, this product is the right ally to the Chefs and their customers.
Selezione Oro Chef is versatile and therefore designed for all professional usage:

- Optimized for double cooking
- Suitable for express cooking
- Tested rapid delivery

Products included in the analysis are Classic semolina pasta cuts (spaghetti, penne, fusilli, etc.); Regionali (gnocchetti sardi, orecchiette pugliesi, casarecce siciliane, trofie liguri). Shape is the only feature differentiating these products.

From a nutritional point of view, its main characteristics are:

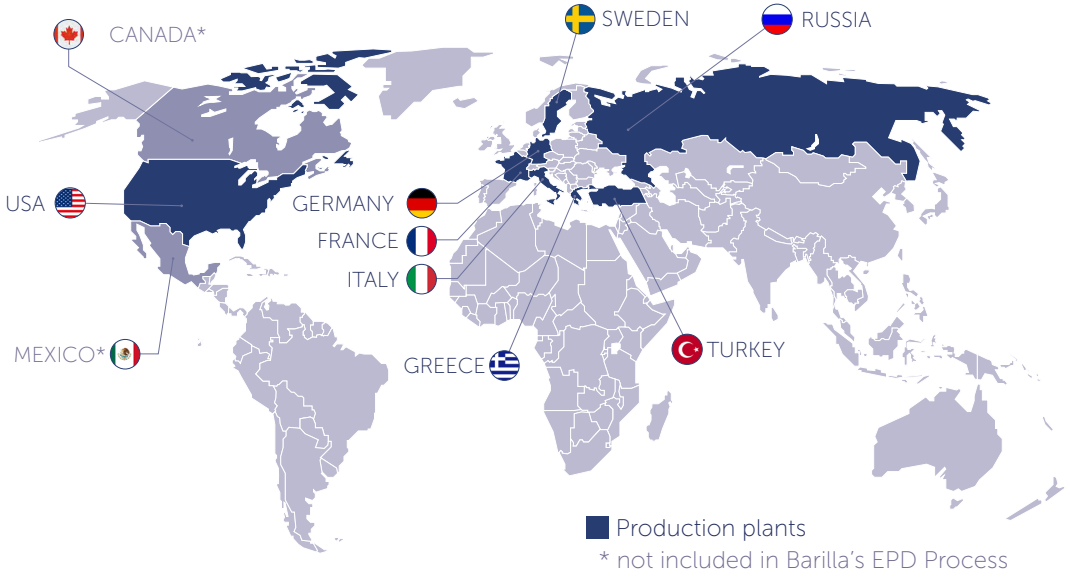
NUTRITIONAL INFORMATION (per 100 g)		
Energy	kJ kcal	1 521 359
Fats *of which saturated*	grams	2 *0.5*
Carbohydrates *of which sugars*	grams	70 *3.5*
Fibres	grams	3
Proteins	grams	14
Salt	grams	0.01

2. Barilla Group

Our story begins in Parma in 1877, when Pietro Barilla opens a small bakery and pasta shop.

Today, after 145 years, our products are eaten by people throughout the day. We have a presence in over 100 countries thanks to our brands, we have become an icon of excellence in the market for pasta, ready-made sauces, baked goods, and crispbread.

Thanks to the 29 production facilities, each year we provide over 2,109,000 tonnes of products to people.



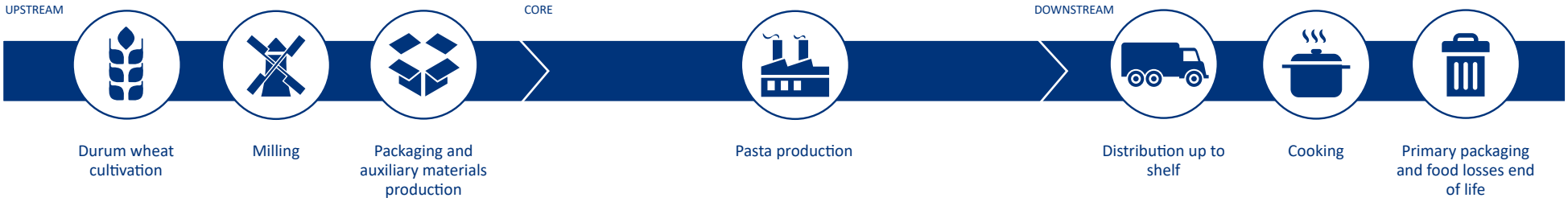
Our Purpose: The joy of food for a better life

In order to make a concrete contribution to global challenges, Barilla has renewed its commitment to society and the planet with a new Purpose containing the "why" of our way of doing business: "The joy of food for a better life".

It is a commitment from field to fork, to offer people tasty products, made with selected raw materials from responsible supply chains.

Because good food is a joy for the present and a choice for a better future.

3. Environmental performance calculation



The environmental performance of pasta was calculated using the **LCA (life cycle analysis) methodology**, including the entire production chain, starting from the cultivation of the raw material until the delivery of the finished product to the retailer.
The study was conducted following the specific product rules published for the **EPD System**: "CPC code 2371 – Uncooked pasta, not stuffed or otherwise prepared".
The contribution to the environmental impacts brought by generic data is less than the 10% in all impact categories.

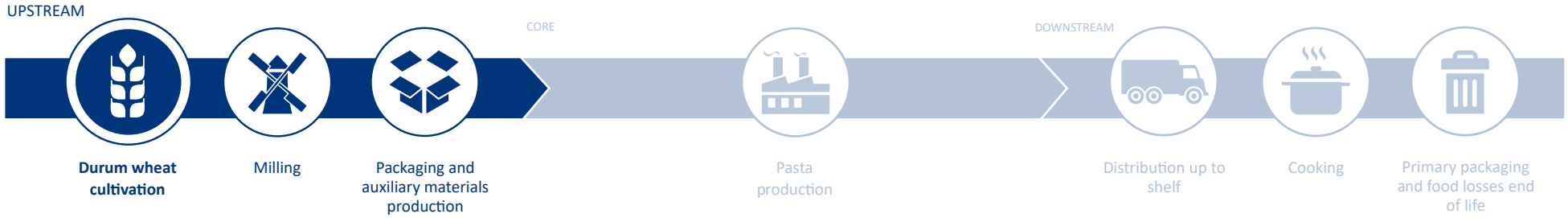
DECLARED UNIT

Data are referred to **1 kg** of product plus the related packaging. The packaging is referred to the **1 kg** format.

SYSTEM BOUNDARIES

The processes constituting the analyzed system were organized in three successive phases, in compliance with the EPD system's requirements.

4. Durum wheat cultivation



DURUM WHEAT CULTIVATION

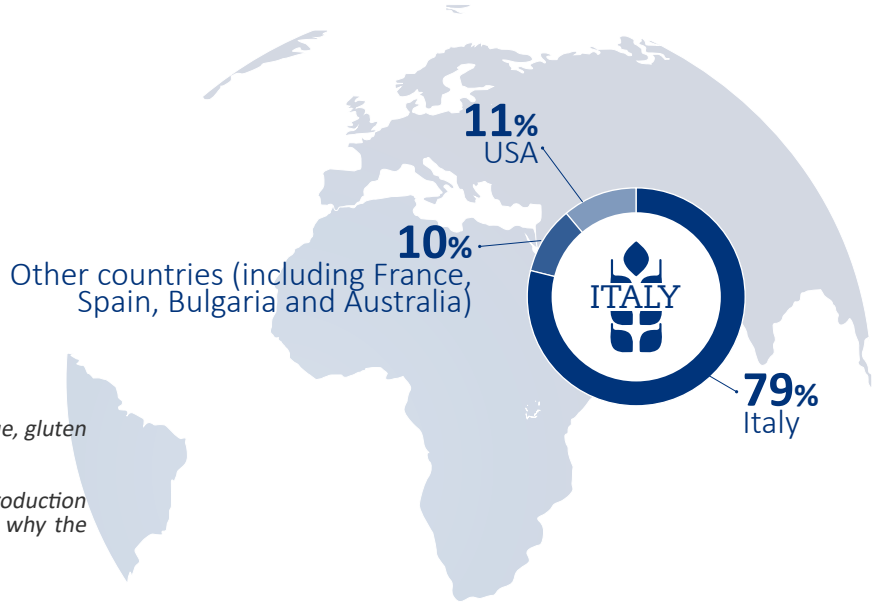
Durum wheat cultivation environmental performances were analysed considering the specific durum wheat origin; 11 different regions were analysed (North, Middle and South Italy; France; Greece; Australia; North and South USA; Turkey; Spain; Central East Europa).

Percentages are calculated as average purchased amounts for years 2018, 2019, 2020.

Country specific data were used for fertilizers amount, crop yields and water use. Secondary data (mainly from Ecoinvent database) were used for fertilizers production and diesel production and use.

For every involved country, yield is calculated as average of three years (2018, 2019, 2020).

***The 34% of Italian wheat** comes from agriculture that meets the standards defined by Barilla Sustainable Farming.*



Durum wheat semolina for Selezione oro Chef pasta has unique features especially for its high protein value, gluten quality and golden color.

Barilla purchases only wheat that fulfills its high safety and quality standards. It may occur that the Italian production during one year it is not sufficient to fulfill the quantitative and qualitative demand from Barilla, that's why the percentage of grain purchased from Italy may decrease or increase from year to year.

THE EFFORTS FOR A RESPONSIBLE FARMING

Since 2010, a team of Barilla professionals has been carrying out a study designed to identify the main areas for growing durum wheat in Italy and the cultivation systems with lower environmental impact. The main results of the project have been the publication of the Handbook for sustainable cultivation of durum wheat and the development of Granoduro.net in collaboration with Horta srl, a spin-off of the Università Cattolica di Piacenza. Barilla's commitment to the future is to disseminate these practices to reduce the durum wheat supply chain's environmental impact.

2009

THE LCA OF PASTA
The EPD shows that the 60% of the Global Warming Potential of pasta is due to the cultivation of durum wheat.

2010

THE SUSTAINABLE AGRICOLTURE PROJECT BEGINNING
A multidisciplinary team, composed of agronomists and LCA experts, starts a study on the agricultural systems to individuate how to reduce the environmental impact of durum wheat cultivation on the environment.

2011

THE HANDBOOK FOR SUSTAINABLE CULTIVATION OF DURUM WHEAT
As a result of the project a handbook with suggested agricultural practices for the reduction of cultivation environmental impact was published and given to farmers.

2012

GRANODURO.NET
The web decision support system (DSS) granoduro.net is developed by Horta and given to farmers.
It supports farmers with information about the optimal seeding rate, the nitrogen requirement, the risk of diseases and about the weather forecast.

granoduro.net

2013

CONTRACT WITH FARMERS FOR SUSTAINABLE DURUM WHEAT
Starting from 2013, bonus are given to farmers who cultivate durum wheat adopting the agricultural practices suggested within Barilla's handbook.

2017

NEW HANDBOOKS AND INCREASED BSF APPLICATION
The positive experience with the first Handbook led to the development of four new handbooks for foreing countries.
Compared to 2013, the total area cultivated with BSF (granoduro.net) is more than doubled.

2020

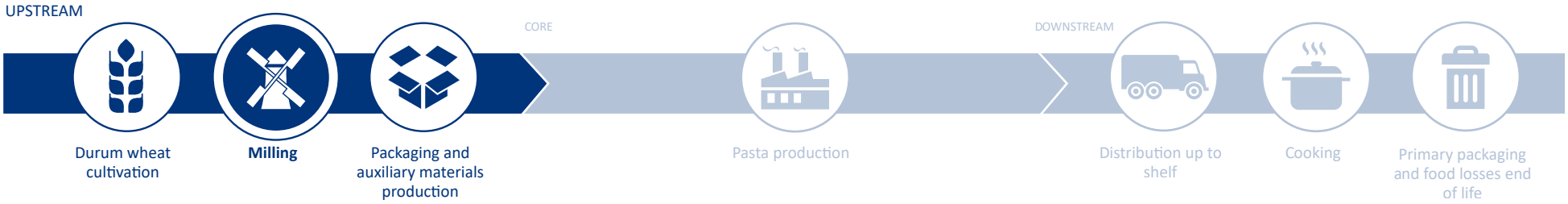
THE DURUM WHEAT MANIFESTO
In 2020 Barilla brand launches in Italy its first pasta produced with 100% Italian durum wheat: this result is possible thanks to farmers ' engagement and the increasingly widespread application of responsible agricultural practices.
For more information, visit the dedicated page on Barilla website.

BARILLA SUSTAINABLE FARMING (BSF) PROMOTES MORE EFFICIENT CROPPING SYSTEMS IN ORDER TO HAVE SAFE AND HIGH QUALITY AGRICULTURAL PRODUCTS IN A WAY THAT PROTECTS AND IMPROVES THE NATURAL ENVIRONMENT AND THE SOCIAL AND ECONOMIC CONDITIONS OF FARMERS.

European CSR Award Scheme

With the project Sustainable Agriculture, Barilla is the winner of the 1st European CSR Award Scheme which is an initiative promoted by the European Commission with the aim to give visibility to the best practices of Corporate Social Responsibility in Europe. The project, in collaboration with HORTA Srl and Life Cycle Engineering, has allowed the definition of the guidelines for the production of durum wheat with agricultural practices with lower environmental impact.

5. Milling



MILLING

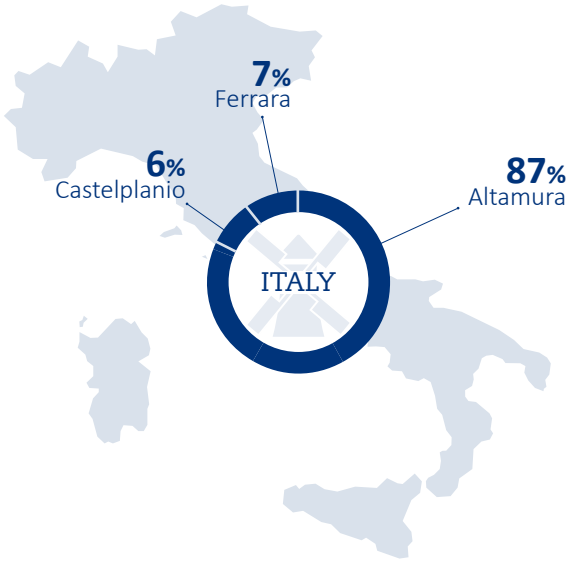
Milling process environmental performances were calculated considering energy and water consumption for each Italian Barilla property mill involved in the Selezione Oro Chef semolina production.

Primary data (2020 year) are used for water and energy consumption ad waste production. Secondary data, mainly from Ecoinvent database, are used for water and energy supply.

Environmental performance on non property mill were evaluated considering property Barilla mill data average.

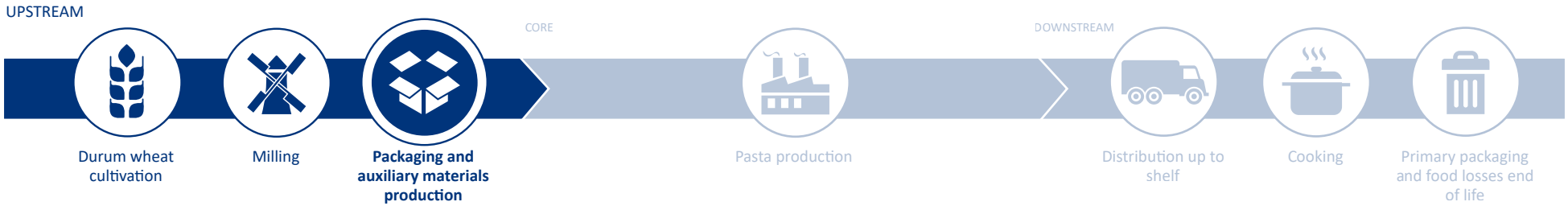
Environmental performances related to durum wheat transport from field to mill were evaluated by means of specific hypothesis for every production area. Secondary data, mainly from Ecoinvent database, are used for transport means.

Durum wheat does not need any particular storage condition (such as refrigeration).



Percentage are referred to durum wheat milled in Barilla property and non-property mills, reference year 2020.

6. Packaging and auxiliary materials production



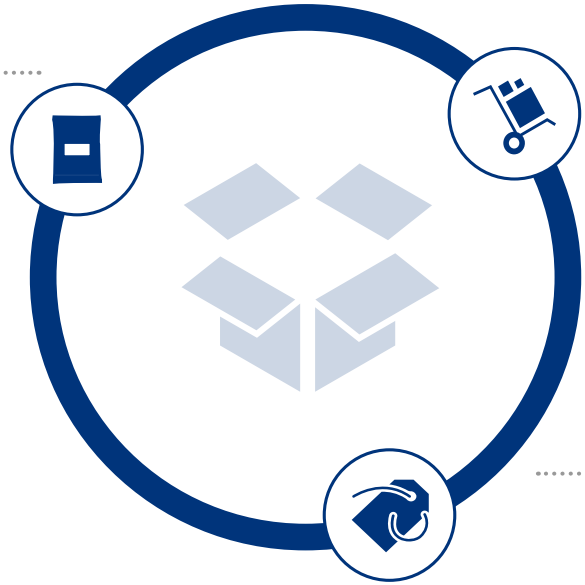
Since 2004, Barilla designs new packaging with the"LCA packaging design tool". It allows the assessment of the environmental impacts of the packaging solutions already during the design phase.

PRIMARY PACKAGING

Packaging environmental performances are calculated considering the 1 kg format (the most conservative one). For all the other items of this product, the impact related to the packaging phase is lower.

The primary packaging consists in a multilayer plastic (PP) film.

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 pasta is designed for recycling.

PACKAGING FOR DISTRIBUTION

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).
The data used have been collected by LCA database (mainly Ecoinvent).

AUXILIARY MATERIALS

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.

7. Pasta production

GENERAL INFORMATION

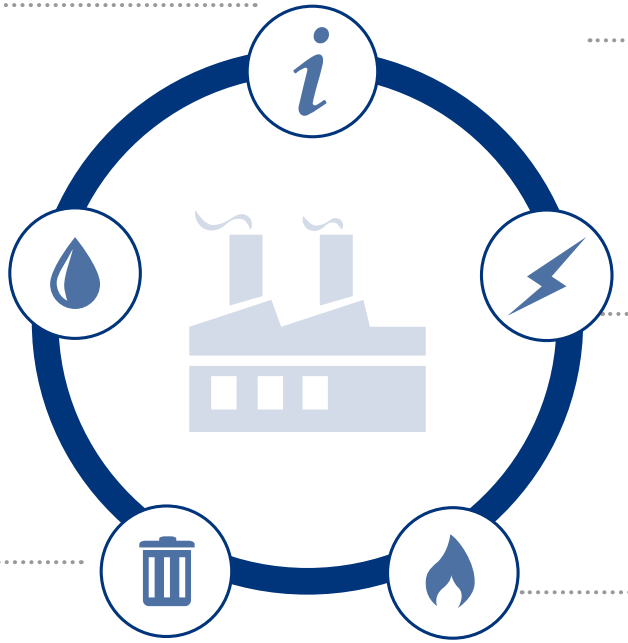
The environmental performances related to the production process are evaluated considering primary data for energy and water consumption and the waste production. The performances are calulated considering the 3 Italian pasta plants owned by Barilla (Pedrignano, Foggia, Marcianise) and weighting their impacts on basis of the pasta production. Secondary data (mainly Ecoinvent) are used for the environmental aspects related to the production of energy and water.

WATER

The water consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.
Data are referred to year 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 are referred to year 2020.



SEMOLA INPUT TRANSPORT

Environmental performances related to semolina transport from mill to plant were evaluated considering road transport (truck) from the national mill mix and the plants, for every nation, using 2020 primary data.
Secondary data, mainly from Ecoinvent database, are used for transport means.

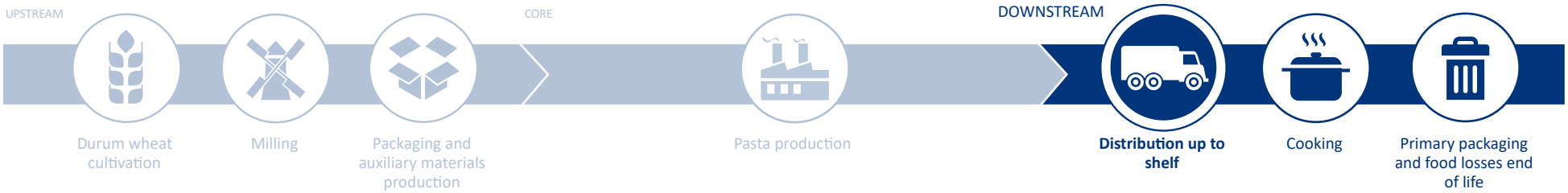
ELECTRICITY

Total plant electricity has been divided using mass allocation (the plant produces other products beyond dry semolina pasta). Electricity production is referred to specific plant energy mix; data are referred to 2020. Electric energy production is related to specific country mix for year 2020 and to cogenerators, where applied.

NATURAL GAS

The natural gas consumption is evaluated using primary data. The overall value is attributed to the product using the mass allocation procedure.
Data are referred to year 2020.

8. Distribution



DISTRIBUTION

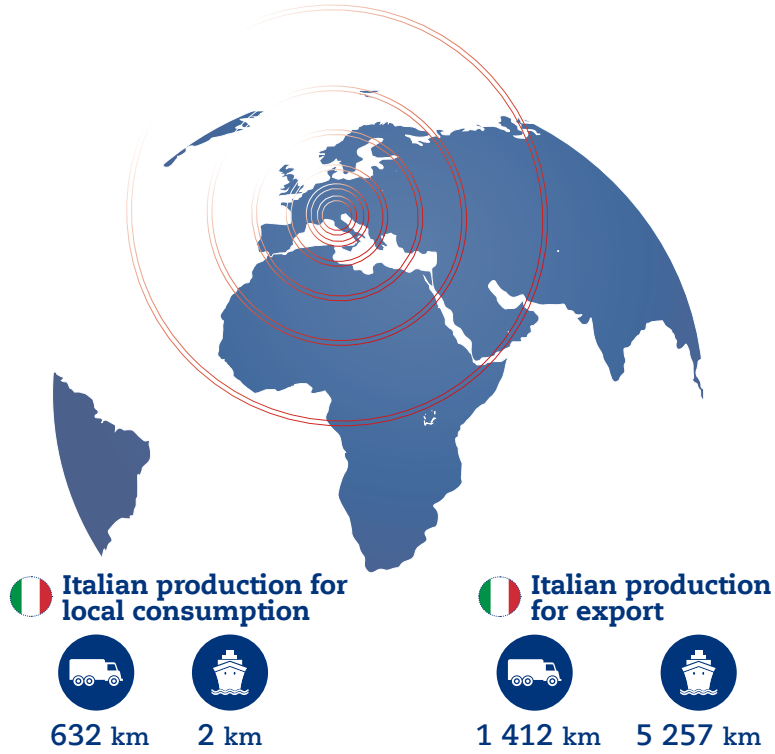
Semolina dried pasta Selezione Oro Chef is produced in 3 italian plants: Pedrignano (PR), Foggia (FG) and Marcianise (CE).
Distribution performance were calculated using the following hypotheses on distances:

- Italian transports are covered:
  - 632 km by road;
  - 2 km by ship.
- Export transports are covered:
  - 1 412 km by road;
  - 5 257 km by ship.

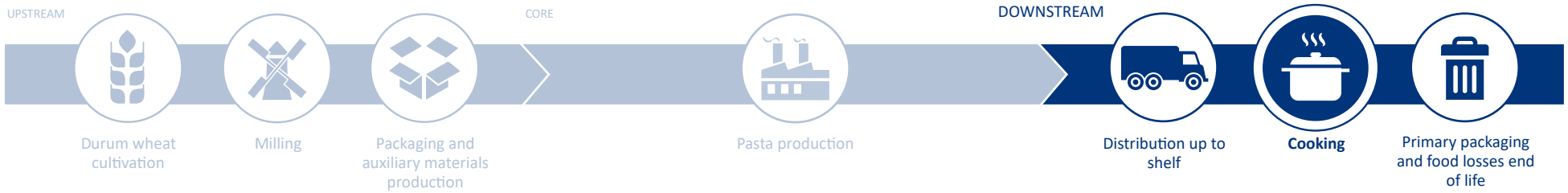
Data are referred to year 2019.

Primary data were used for distances covered by truck, train an ship; secondary data (Ecoinvent database) were used for transport means.
The product does not need any particular storage condition (such as refrigeration).

Impacts related to transport packaging end of lifeare calculated considering the average end of life scenario for paper, paperboard and plasticwithin the most relevant distribution countries (reference: Eurostat 2018).



9. Cooking

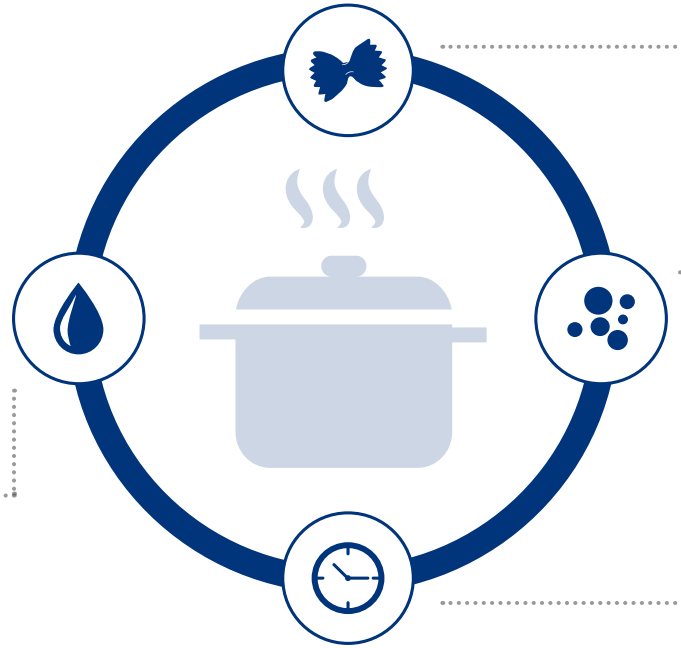


COOKING PHASE

The cooking phase is strictly correlated to consumer behaviour and the related impacts could be estimated taking into account the "cooking indications" that are usually provided by the company on packaging.

The impacts related to the cooking phase could be estimated considering the cooking of 1 kg of pasta and the hypothesis reported on the PCR:

- Boiling phase: 0.18 kWh per kg of water;
- Cooking phase: 0.05 kWh per minute of cooking.



10 liters of water
per kg of pasta

1 kg of pasta

1.8 kWh
per kg of pasta
(boiling phase)

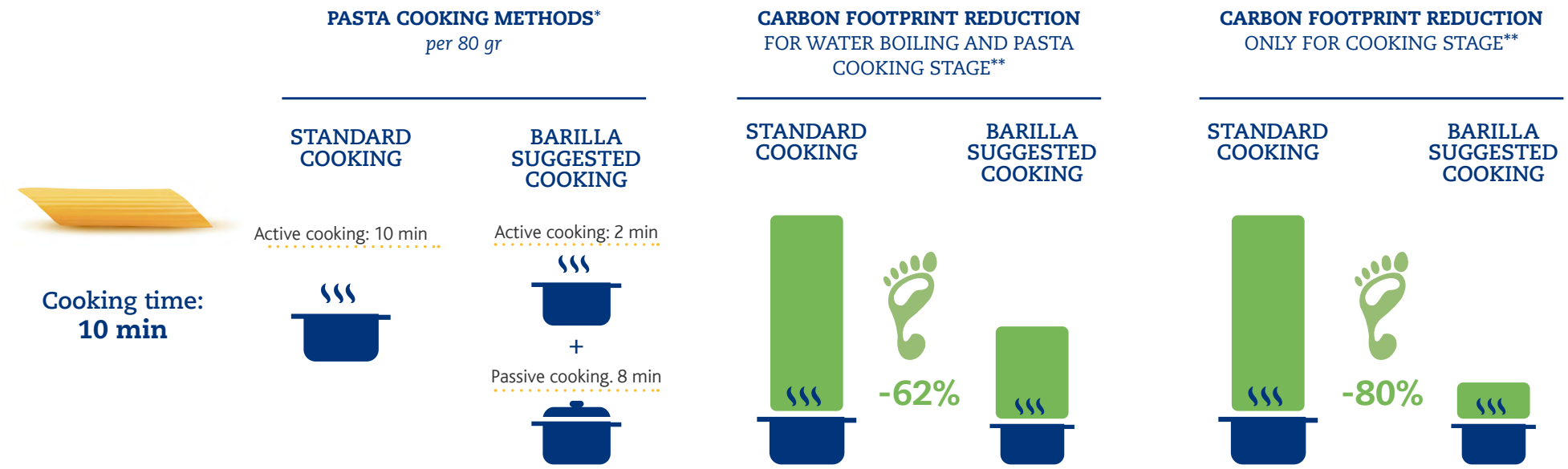
0.05 kWh
per minute of cooking

Cooking environmental performances are provided only for local consumption; for export and worldwide average are not provided due to the high number of involved countries.

Barilla suggested cooking method

The energy necessary for the cooking stage has a significant impact. By choosing a cooking method that uses less energy, it is possible to sensibly reduce the carbon footprint of this stage. Pasta cooking time can be divided in two parts: the time needed to boil water and the one necessary to cook pasta. Usually, after boiling water, pasta is cooked by keeping the heat on for the entire suggested cooking time, e.g. for 10 minutes *(active cooking*). However, pasta can be cooked in a more efficient way by keeping the heat on only for the first 2 minutes of cooking and then, for the remaining suggested time, the heat can be turned off while keeping the lid on the pot (*passive cooking*).

Passive cooking can reduce the carbon footprint, due to the savings of GHG emissions related to energy use, without affecting the product quality.
Considering the cooking process of a 10-minutes-cooking 80 gr portion of pasta, cooked with gas and electric stoves, these are the possible savings:

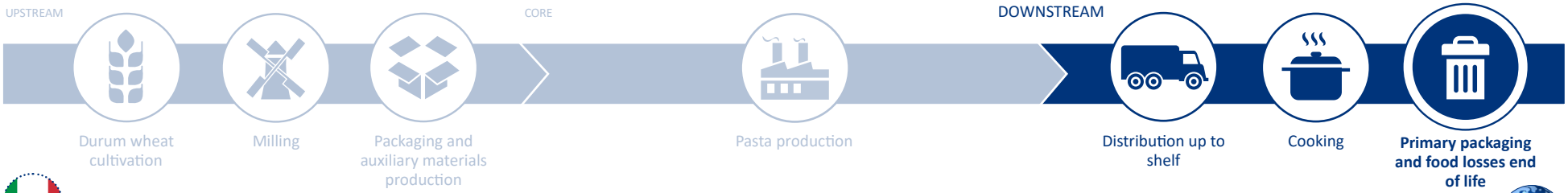


Barilla-suggested cooking method does not affect the organoleptic properties of the product but it requires more attention during the cooking phase: pay attention that pasta is completely submerged into water and mix it regularly during cooking.

*Cooking proportion is the following: 1l water x 100gr of pasta.

**The results are valid for gas and electric stove cooking.

10. Primary packaging end of life and food losses



PRIMARY PACKAGING

ITALY

Reference: COREPLA report 2018

20% RECYCLE	Avoiding the production of virgin material.
67% ENERGY RECOVERY	Recovering packaging energy content.
13% DISPOSAL	In Italy, 19% of waste sent to disposal are burned without energy recovery, the others are sent to landfill.

PACKAGING FOR TRANSPORTATION

Reference: COMIECO report 2018

81% RECYCLE	Avoiding the production of virgin material.
8% ENERGY RECOVERY	Recovering packaging energy content.
11% DISPOSAL	In Italy, 19% of waste sent to disposal are burned without energy recovery, the others are sent to landfill.

PRIMARY PACKAGING

EXPORT

Reference: Eurostat database 2017

Avoiding the production of virgin material.	RECYCLE 36%
Recovering packaging energy content.	ENERGY RECOVERY 30%
In average export scenario, 16% of waste sent to disposal are burned without energy recovery, the others are sent to landfill.	DISPOSAL 34%

PACKAGING FOR TRANSPORTATION

Reference: Eurostat database 2017

Avoiding the production of virgin material.	RECYCLE 86%
Recovering packaging energy content.	ENERGY RECOVERY 6%
In average export scenario, 16% of waste sent to disposal are burned without energy recovery, the others are sent to landfill.	DISPOSAL 8%

Environmental performances of packaging end of life, for local market, are calculated by means of distribution countries end of life scenarios.
For the export markets environmental performances are elaborated considering the end of life scenarios of the most representative distribution countries (France, Germany, Australia and United Kingdom); the remaining countries are assimilated to an average European scenario (Europe volumes are higher than extra-europe countries).

FOOD LOSSES

The impacts related to food waste in use phase are estimated assuming that 2% of the pasta is not consumed and is disposed of as waste, sent to the following destinations: 50% disposal (25% landfill + 25% incineration without energy recovery), 25% composting, 25% anaerobic digestion, following the indications of the PCR document.

11. Environmental results - Italy for local consumption

USE OF RESOURCES data referred to 1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
		Durum wheat cultivation	*Milling*	*Packaging and auxiliary materials production*	*Pasta production*	*Distribution up to shelf*		*Packaging end of life and food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	1,20E-01	2,12E-01	1,37E-01	2,77E-02	1,96E-03	**5,00E-01**	1,01E-04	4,99E-02	1,63E+00
	Used as raw materials*	0,00E+00	0,00E+00	5,36E-02	0,00E+00	0,00E+00	**5,36E-02**	0,00E+00	0,00E+00	0,00E+00
	Total	**1,20E-01**	**2,12E-01**	**1,91E-01**	**2,77E-02**	**1,96E-03**	**5,53E-01**	**1,01E-04**	**4,99E-02**	**1,63E+00**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	4,99E+00	5,84E-02	8,50E-01	4,16E+00	1,27E+00	**1,13E+01**	4,60E-03	1,32E+01	3,89E+01
	Used as raw materials	0,00E+00	1,32E-05	1,58E-01	0,00E+00	0,00E+00	**1,58E-01**	0,00E+00	0,00E+00	0,00E+00
	Total	**4,99E+00**	**5,84E-02**	**1,01E+00**	**4,16E+00**	**1,27E+00**	**1,15E+01**	**4,60E-03**	**1,32E+01**	**3,89E+01**
Secondary Material (g)		0,00E+00	0,00E+00	3,04E+01	0,00E+00	0,00E+00	**3,04E+01**	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	1,81E-02	0,00E+00	0,00E+00	**1,81E-02**	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**	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (liters)		1,06E+01	8,88E-02	5,49E-01	1,21E+00	5,66E-02	**1,25E+01**	8,76E-03	1,08E+01	1,75E+01

OUTPUT FLOWS data referred to 1 kg of product	UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
	Durum wheat cultivation	*Milling*	*Packaging and auxiliary materials production*	*Pasta production*	*Distribution up to shelf*		*Packaging end of life and food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
Waste to animal feed or similar (g)	0,00E+00	0,00E+00	0,00E+00	2,21E+01	0,00E+00	**2,21E+01**	0,00E+00	0,00E+00	0,00E+00
Components for reuse (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (g)	**0,00E+00**	**2,20E-01**	**5,05E+00**	**6,80E+00**	**2,26E+01**	**3,47E+01**	**6,00E+00**	0,00E+00	0,00E+00
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	1,37E-01	0,00E+00	**1,37E-01**	5,00E+00	0,00E+00	0,00E+00
Exported energy. electricity (MJ)	0,00E+00	0,00E+00	0,00E+00	1,65E-01	0,00E+00	**1,65E-01**	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**	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 to1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
		Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	5,17E+02	3,32E+00	4,24E+01	2,49E+02	9,04E+01	**9,03E+02**	7,57E+00	7,84E+02	2,10E+03
	Biogenic	8,88E-02	1,16E-01	1,05E-01	2,00E-01	3,93E+00	**4,44E+00**	2,89E+00	3,26E-01	5,36E-01
	Land use and land transformation	4,04E-01	1,54E-03	8,02E-01	3,47E-03	7,98E-04	**1,21E+00**	1,04E-04	3,42E-02	1,13E-01
	Total	**5,18E+02**	**3,44E+00**	**4,33E+01**	**2,50E+02**	**9,43E+01**	**9,09E+02**	**1,05E+01**	**7,84E+02**	**2,10E+03**
Acidification Potential - $g\ SO_2$ eq		1,25E+01	9,56E-03	1,53E-01	3,79E-01	4,76E-01	**1,35E+01**	3,10E-03	8,17E-01	6,52E+00
Eutrophication Potential - $g\ PO_4^{---}$ eq		7,03E+00	1,12E-03	4,48E-02	4,53E-02	7,38E-02	**7,19E+00**	3,48E-03	1,96E-01	7,15E-01
Photochemical Oxidant Formation Potential - gNMVOC eq		2,44E+00	6,17E-03	1,44E-01	4,08E-01	6,07E-01	**3,60E+00**	4,57E-03	8,20E-01	4,14E+00
Abiotic Depletion Potential - Elements g Sb eq		1,33E-03	4,07E-08	1,18E-05	1,42E-06	3,91E-06	**1,35E-03**	4,92E-08	7,08E-06	3,17E-05
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		4,84E+00	5,09E-02	9,34E-01	3,95E+00	1,27E+00	**1,10E+01**	4,45E-03	1,31E+01	3,39E+01
Water scarcity potential. m^3 eq		4,95E-01	3,53E-03	1,49E-02	5,92E-02	-1,91E-04	**5,73E-01**	2,13E-04	1,16E-01	2,47E-01

WASTE PRODUCTION data referred to 1 kg of product	UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
	Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
Hazardous waste disposed (g)*	5,91E-05	0,00E+00	4,59E-04	0,00E+00	0,00E+00	**5,18E-04**	0,00E+00	0,00E+00	0,00E+00
Non-Hazardous waste disposed (g)*	1,02E+00	2,59E+02	4,00E+00	0,00E+00	0,00E+00	**2,64E+02**	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed (g)	2,25E-01	9,40E-03	7,61E-02	7,98E-02	4,12E-02	**4,32E-01**	2,63E-04	7,08E-02	6,40E+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.

**Zero values indicate that – even if some waste are produced and disposed – their impact is evaluated within the system boundaries.*

PRODUCT ENVIRONMENTAL PERFORMANCES

Durum wheat semolina pasta Food Service 5kg - Italy for local market

	Durum wheat cultivation	*Milling*	*Packaging and auxiliary materials production*	*Pasta production*	*Distribution up to shelf*	*From field to distribution up to shelf*	*Primary packaging end of life and food losses*	*Cooking phase*	
ECOLOGICAL FOOTPRINT	6.8	<0.1	0.1	0.6	0.3	7.8 global m²/kg	<0.1	2	5.7
CARBON FOOTPRINT	518	3	43	250	94	909 gCO_2eq/kg	11	784	2 101
WATER SCARCITY	495	4	15	59	<1	573 litres eq/kg	<1	116	247

12. Environmental results - Italy for export

USE OF RESOURCES data referred to 1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
		Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	1,20E-01	2,12E-01	1,37E-01	2,77E-02	5,07E-03	**5,03E-01**	1,01E-04	4,41E-02	1,24E+00
	Used as raw materials*	0,00E+00	0,00E+00	5,36E-02	0,00E+00	0,00E+00	**5,36E-02**	0,00E+00	0,00E+00	0,00E+00
	Total	**1,20E-01**	**2,12E-01**	**1,91E-01**	**2,77E-02**	**5,07E-03**	**5,56E-01**	**1,01E-04**	**4,41E-02**	**1,24E+00**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	4,99E+00	5,84E-02	8,50E-01	4,16E+00	3,42E+00	**1,35E+01**	4,49E-03	1,27E+01	3,95E+01
	Used as raw materials	0,00E+00	1,32E-05	1,58E-01	0,00E+00	0,00E+00	**1,58E-01**	0,00E+00	0,00E+00	0,00E+00
	Total	**4,99E+00**	**5,84E-02**	**1,01E+00**	**4,16E+00**	**3,42E+00**	1,36E+01	**4,49E-03**	**1,27E+01**	**3,95E+01**
Secondary Material (g)		0,00E+00	0,00E+00	3,04E+01	0,00E+00	0,00E+00	**3,04E+01**	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	1,81E-02	0,00E+00	0,00E+00	**1,81E-02**	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**	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (liters)		1,06E+01	8,88E-02	5,49E-01	1,21E+00	1,44E-01	**1,26E+01**	8,33E-03	1,09E+01	1,92E+01

OUTPUT FLOWS data referred to 1 kg of product	UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
	Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
Waste to animal feed or similar (g)	0,00E+00	0,00E+00	0,00E+00	2,21E+01	0,00E+00	**2,21E+01**	0,00E+00	0,00E+00	0,00E+00
Components for reuse (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (g)	0,00E+00	2,20E-01	5,05E+00	6,80E+00	2,40E+01	**3,60E+01**	6,82E+00	0,00E+00	0,00E+00
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	1,37E-01	0,00E+00	**1,37E-01**	5,00E+00	0,00E+00	0,00E+00
Exported energy. electricity (MJ)	0,00E+00	0,00E+00	0,00E+00	1,65E-01	0,00E+00	**1,65E-01**	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**	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 to1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
		Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	5,17E+02	3,32E+00	4,24E+01	2,49E+02	2,47E+02	**1,06E+03**	5,66E+00	7,20E+02	3,32E+02
	Biogenic	8,88E-02	1,16E-01	1,05E-01	2,00E-01	3,12E+00	**3,63E+00**	2,89E+00	2,40E-01	2,47E-01
	Land use and land transformation	4,04E-01	1,54E-03	8,02E-01	3,47E-03	2,12E-03	**1,21E+00**	1,04E-04	2,87E-02	5,52E-02
	Total	**5,18E+02**	**3,44E+00**	**4,33E+01**	**2,50E+02**	**2,50E+02**	**1,06E+03**	**8,54E+00**	**7,20E+02**	**3,32E+02**
Acidification Potential - g SO_2 eq		1,25E+01	9,56E-03	1,53E-01	3,79E-01	2,08E+00	**1,51E+01**	2,91E-03	5,67E-01	9,12E-01
Eutrophication Potential - g PO_4^{---} eq		7,03E+00	1,12E-03	4,48E-02	4,53E-02	2,22E-01	**7,34E+00**	3,44E-03	1,83E-01	2,25E-01
Photochemical Oxidant Formation Potential - gNMVOC eq		2,44E+00	6,17E-03	1,44E-01	4,08E-01	1,87E+00	**4,87E+00**	4,34E-03	6,18E-01	7,15E-01
Abiotic Depletion Potential - Elements g Sb eq		1,33E-03	4,07E-08	1,18E-05	1,42E-06	8,99E-06	**1,35E-03**	4,25E-08	8,04E-06	1,30E-04
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		4,84E+00	5,09E-02	9,34E-01	3,95E+00	3,41E+00	**1,32E+01**	4,35E-03	1,25E+01	5,36E+00
Water scarcity potential. m^3 eq		4,95E-01	3,53E-03	1,49E-02	5,92E-02	-7,45E-04	**5,72E-01**	2,10E-04	6,94E-02	7,78E-02

WASTE PRODUCTION data referred to 1 kg of product	UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
	Durum wheat cultivation	Milling	Packaging and auxiliary materials production	Pasta production	Distribution up to shelf		Packaging end of life and food losses	Pasta cooking, if gas	Pasta cooking, if electric
Hazardous waste disposed (g)*	5,91E-05	0,00E+00	4,59E-04	0,00E+00	0,00E+00	**5,18E-04**	0,00E+00	0,00E+00	0,00E+00
Non-Hazardous waste disposed (g)*	1,02E+00	2,59E+02	4,00E+00	0,00E+00	0,00E+00	**2,64E+02**	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed (g)	2,25E-01	9,40E-03	7,61E-02	7,98E-02	1,10E-01	**5,01E-01**	2,64E-04	2,90E-01	4,29E+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.

**Zero values indicate that – even if some waste are produced and disposed – their impact is evaluated within the system boundaries.*

PRODUCT ENVIRONMENTAL PERFORMANCES

Durum wheat semolina pasta Food Service 5kg - Italy for export

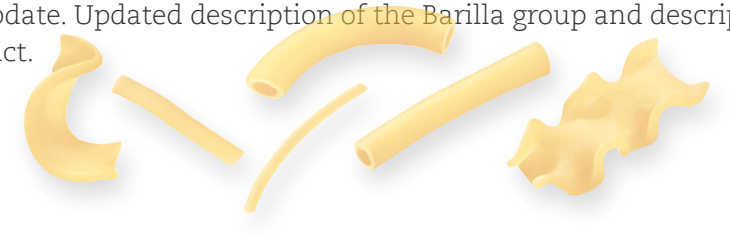
	Durum wheat cultivation	*Milling*	*Packaging and auxiliary materials production*	*Pasta production*	*Distribution up to shelf*	*From field to distribution up to shelf*	*Primary packaging end of life and food losses*	*Cooking phase*	
ECOLOGICAL FOOTPRINT	6.8	<0.1	0.1	0.6	0.7	8.3 global m²/kg	<0.1	1.9	0.9
CARBON FOOTPRINT	518	3	43	250	250	1 065 gCO_2eq/kg	9	720	332
WATER SCARCITY	495	4	15	59	<1	572 litres eq/kg	<1	69	78

Cooking environmental performances are referred to the export country with the highest distributed volumes (France).

13. Differeces versus previous versions of EPD

The differences versus previous EPD versions are due mainly to: updated yields for durum wheat cultivation, new input of environmental performances of plant and mills auxiliary materials, updated emission factors for the specific energy mixes, new characterization factors.
Finally the Product Environmental Performance section has been modified with the substitution of Virtual Water Content with Water Scarcity indicator.

2023/09/07 editorial review: replaced product images with its packaging for graphical update. Updated description of the Barilla group and description of the product.



14. 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 2010:01; CPC 2371 - PCR for uncooked pasta, not stuffed or otherwise prepared; v. 4.01 20.09.2021;
- COMIECO Raccolta, Riciclo e Recupero di carta e cartone 2018;
- COREPLA relazione sulla gestione 2018;
- Eurostat database for waste management, latest version (2018).

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

Barilla G. e R. Fratelli- Società per Azioni, via Mantova 166, 43122, Parma, Italy. www.barillagroup.com
For additional information relative to the activities of the Barilla Group or in regards to this environmental declaration, please contact:
Luca Ruini - luca.ruini@barilla.com

Barilla
The Italian Food Company. Since 1877.

Technical support and grafic design: **Life Cycle Engineering SpA - 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

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 ethylene equivalent (g NMVOC - equivalent).