Filiz Dry Semolina Pasta

Environmental Product Declaration

The first EPD process certified in the food industries

REGISTRATION NUMBER	CPC CODE	PUBLICATION DATE	REVISION	VALID UNTIL	PROGRAMME	PROGRAMME OPERATOR
S-P-00489	2731 Uncooked pasta, not stuffed or otherwise prepared PCR 2010:01 v. 4.01 20.09.2021	2011/10/03	6 of 2022/03/02	2024/11/06	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 FILIZ

Founded in 1977, Filiz is one of the largest manufacturers of pasta in Turkey, one of the largest consumers country of pasta in the world. Filiz has been part of Barilla since 1994.

Further information on www.filizmakarna.com.tr.

THE PLANT AND THE PROCESS

Filiz dry semolina pasta is produced in the Bolu plant in Turkey with only durum wheat semolina and water. It is produced by extrusion or lamination and finally by a drying process.
The pasta production process does not require additives and preservatives: it is the drying process that guarantees the conservation.
Every year about 90 000 tons of Filiz pasta are produced.

THE PRODUCTS

Products included in the analysis are classic pasta formats (penne, spaghetti, fusilli, etc.). Shape is the only feature differentiating these products, since they are all produced using as only ingredients water and durum wheat semolina.

PRODUCT CONTENT AND NUTRITIONAL INFO

The durum wheat semolina pasta concerned by this declaration is made only by durum semolina and water.
From a nutritional point of view, its main characteristics are:

NUTRITIONAL INFORMATION (per 100 g)		
Energy	kcal kJ	358 1 517
Fats *of which saturated*	grams	2.0 *0.5*
Carbohydrates *of which sugars*	grams	71.7 *3.0*
Fibres	grams	3.5
Proteins	grams	11.5
Sodium	grams	0.013

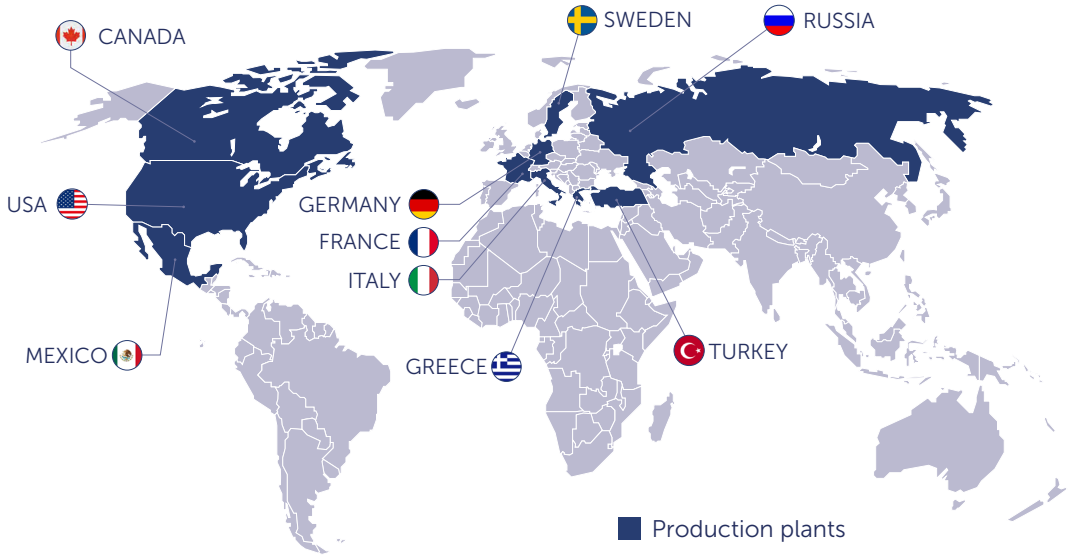
2. Barilla Group

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.

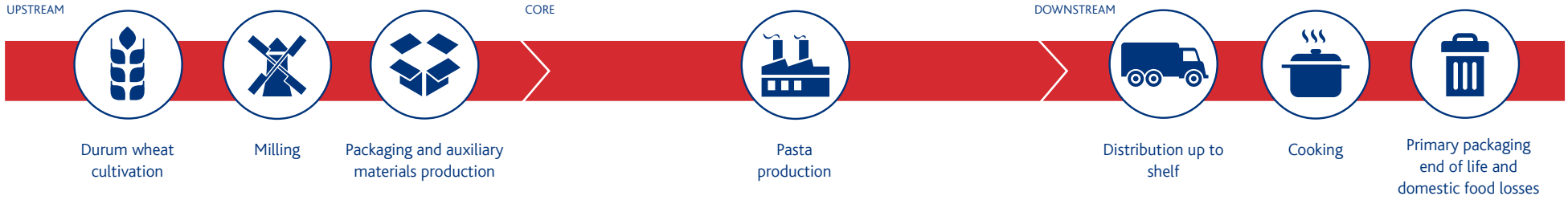
GOOD FOOD means taste, pleasure and a daily gesture of love for the people themselves.

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 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 **500 g** format, reported to 1 kg of product.

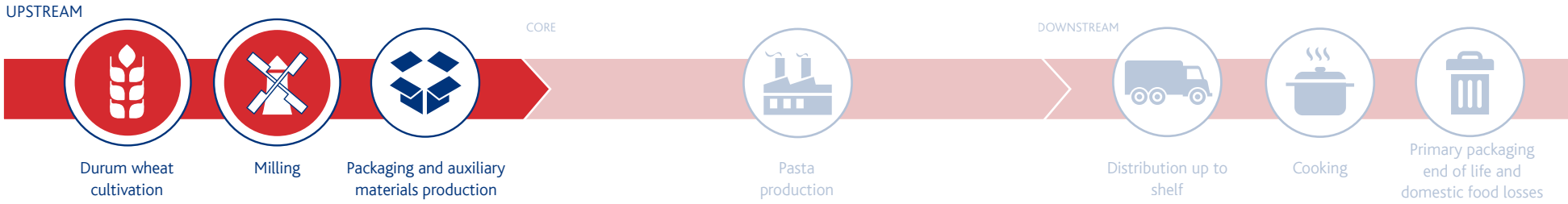
SYSTEM BOUNDARIES

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

GEOGRAPHICAL SCOPE

The geographical scope of this EPD corresponds to the distribution area of the product; concerning Filiz Pasta, this is mainly Turkey for 95% of volumes distributed; the remaining 5% volumes are distributed in Ciprus, Arabian peninsula countries, central America countries.

4. Durum wheat cultivation and milling



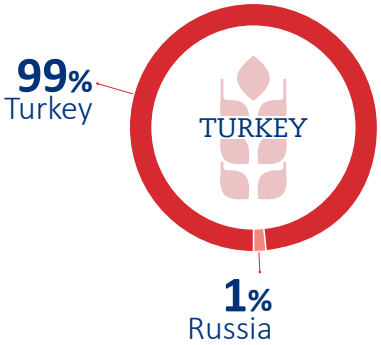
DURUM WHEAT CULTIVATION

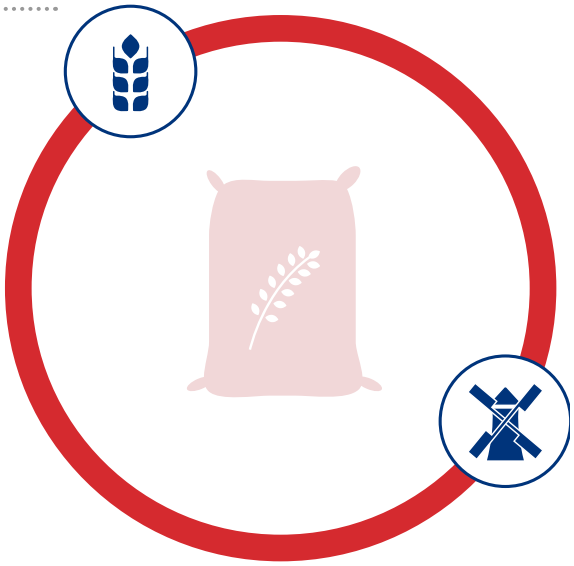
Durum wheat cultivation environmental performances were analysed considering the specific durum wheat origin: mainly Turkey, and a minor amount from Russia.

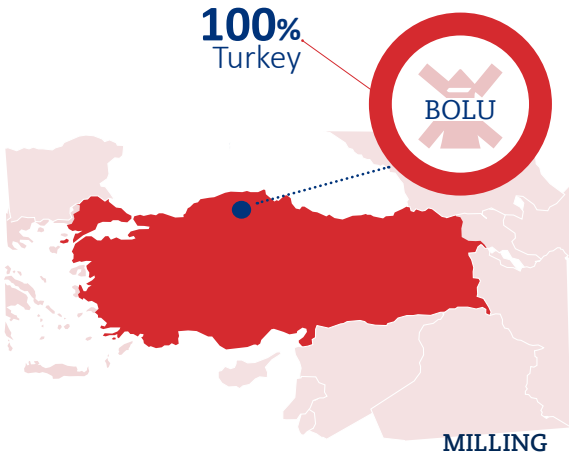
Percentages are calculated as average purchased amounts for years 2018, 2019, 2020.

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).







MILLING

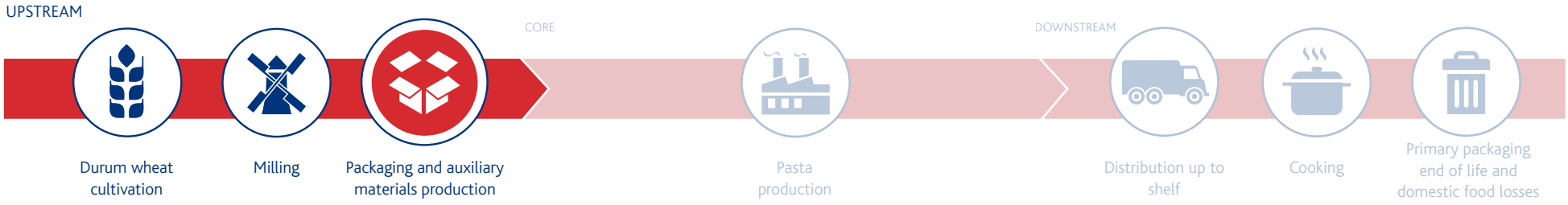
Milling process environmental performances were calculated considering the specific energy and water consumption in Bolu mill.

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 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).

5. Packaging and auxiliary materials production



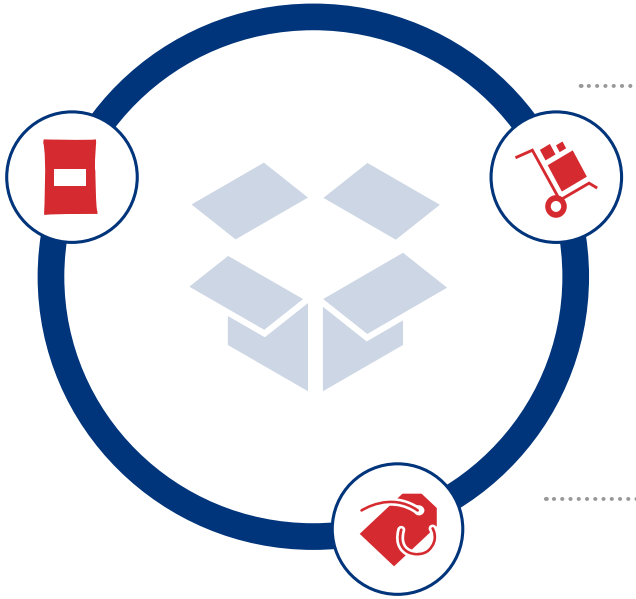
PRIMARY PACKAGING

Packaging environmental performances are calculated taking into account the 500 g format of penne packaging (the most conservative format among the top seller products). 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.

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 PRODUCTION

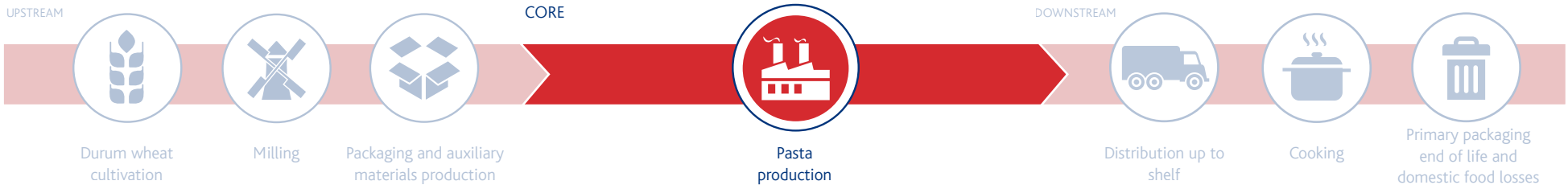
PACKAGING FOR TRANSPORTATION

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).
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.

6. Pasta production



GENERAL INFORMATION

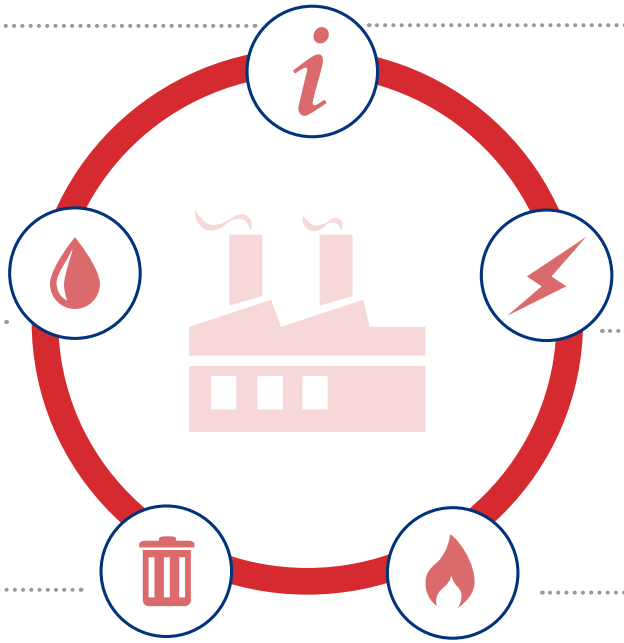
The environmental performances related to the production process are evaluated considering primary data for energy and water consumption and the waste production of Bolu plant.
Secondary data (mainly Ecoinvent) are used for the environmental aspects related to the production of energy and water.

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.



SEMOLINA 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.

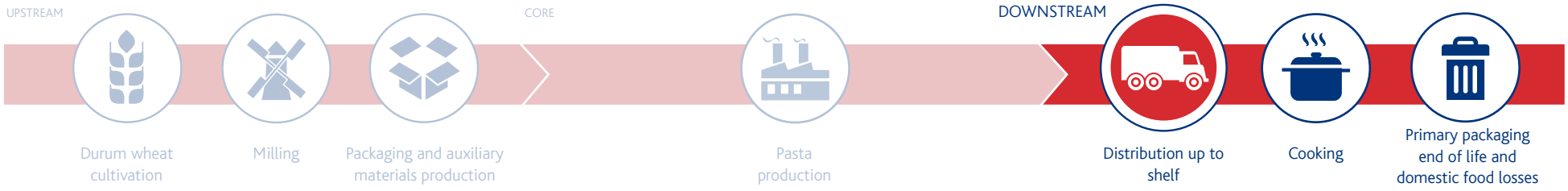
ELECTRICITY

Total plant electricity consumption has been divided using mass allocation. Data are referred to 2020. Environmental performances of electric energy production were evaluated considering the specific country mix (Turkey) for year 2020.

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.

7. Distribution



DISTRIBUTION

Filiz pasta is produced in the Turkish plant of Bolu.

Distribution performance were calculated using the following hypotheses.

Local market transports are covered 100% by truck, an hypothesis of 380 km average distance is considered.

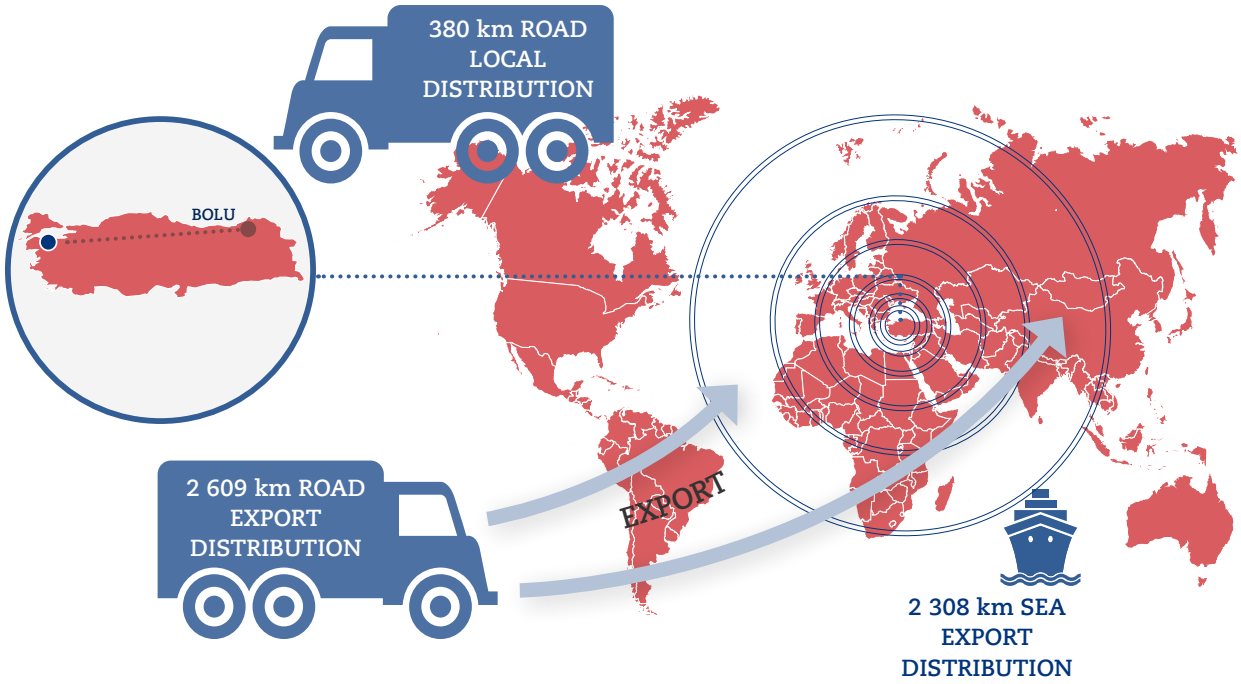
Export transports are considered:

- covered by truck, with an average distance equal to 2 609 km;
- covered by ship, with an average distance equal to 2 308 km

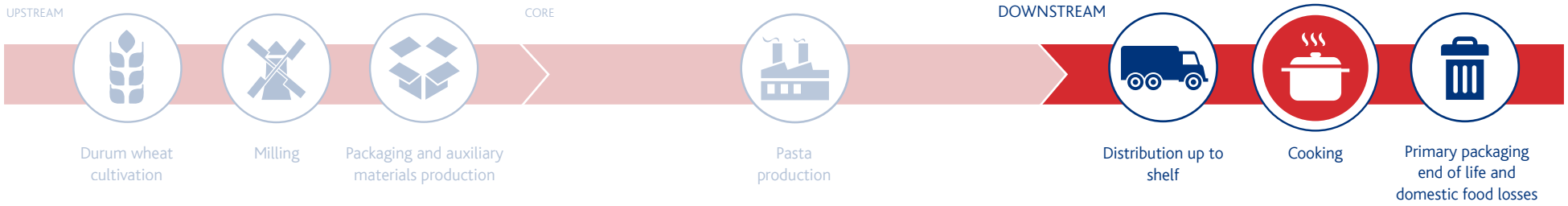
All data are referred to year 2019.

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 life are calculated considering the average end of life scenario for paper, paperboard and plastic within the most relevant distribution countries (reference: Eurostat 2018).



8. Cooking

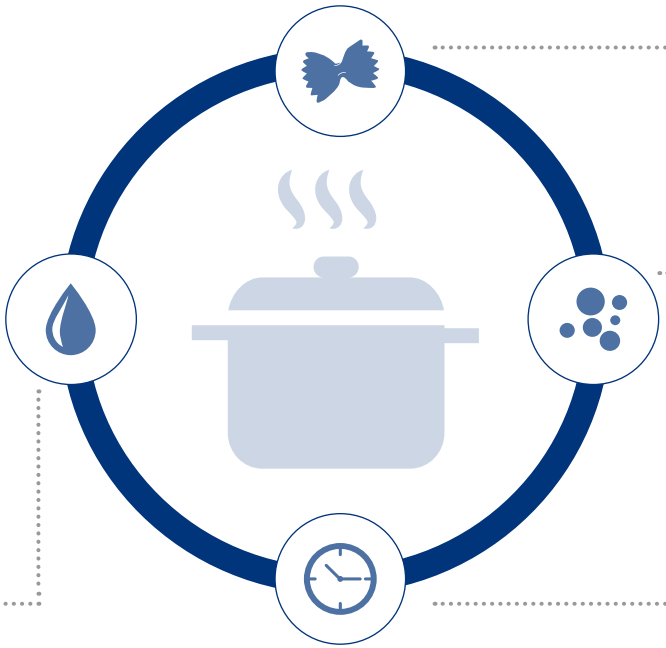


COOKING PHASE

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.



1 kg of pasta

1.8 kWh per kg of pasta (boiling phase)

10 litres of water per kg of pasta

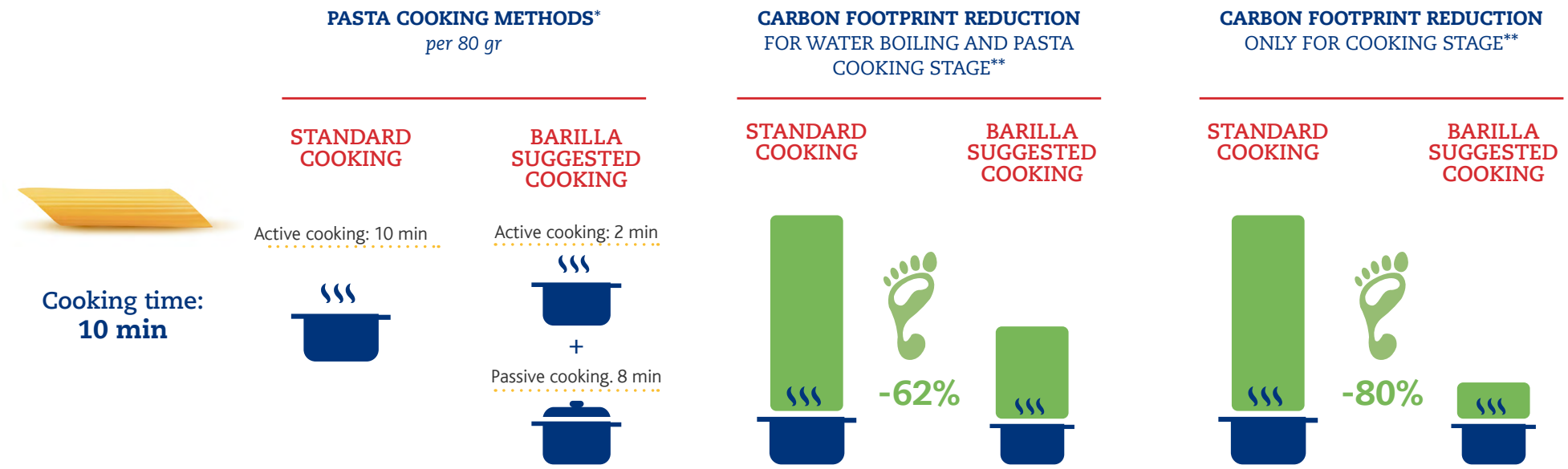
0.05 kWh per minute of cooking

Cooking environmental performances are evaluated considering the Turkish residual electricity mix for local consumption. For export market the United Arab Emirates electricity mix is used.

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:

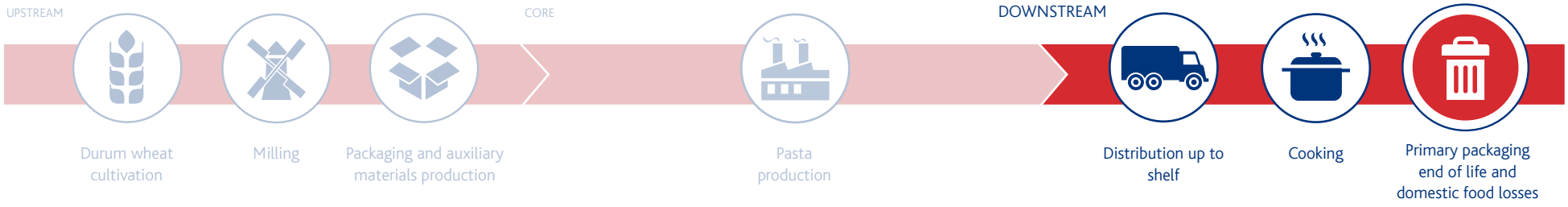


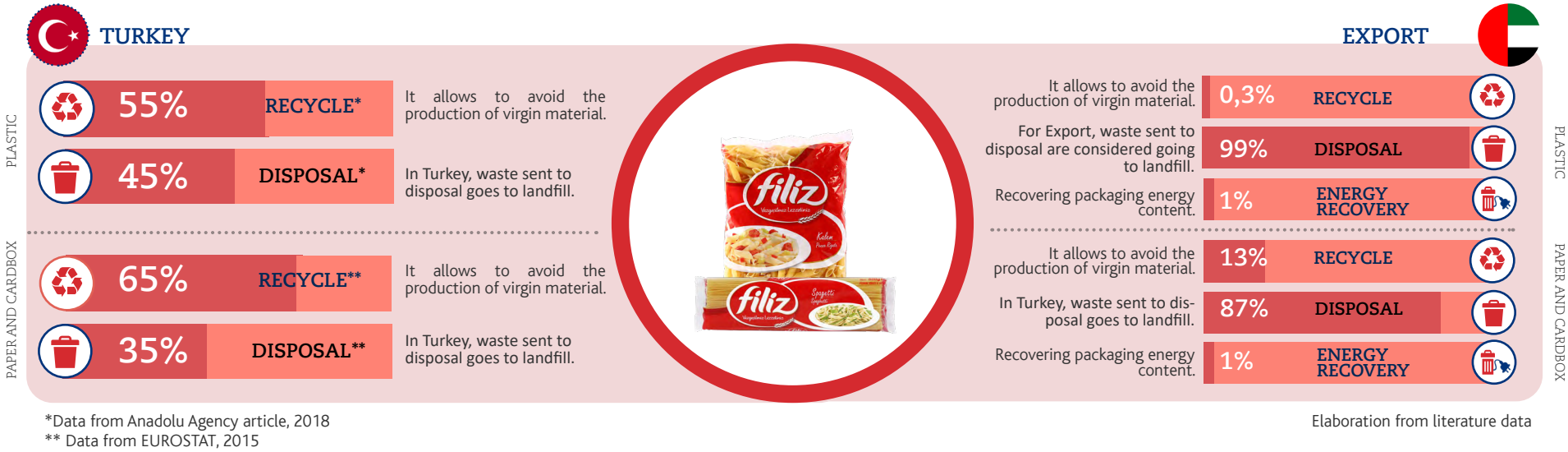
Barilla-suggested cooking method does not affect the organoleptic properties of the product but it requires more attention during the cooking phase: pay attention that pasta is completely submerged into water and mix it regularly during cooking.

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

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

9. Primary packaging end of life and domestic food losses





*Data from Anadolu Agency article, 2018
** Data from EUROSTAT, 2015

Elaboration from literature data

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 country (United Arab Emirates).

DOMESTIC FOOD LOSSES

The impacts related to domestic food waste 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.

10. Environmental results - Turkey local market

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 domestic food losses	Pasta cooking, if gas	Pasta cooking, if electric
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	9,61E-01	1,05E-01	2,33E-01	2,39E-01	1,42E-03	**1,54E+00**	1,06E-04	5,25E-02	5,39E+00
	Used as raw materials*	0,00E+00	0,00E+00	9,24E-02	0,00E+00	0,00E+00	**9,24E-02**	0,00E+00	0,00E+00	0,00E+00
	Total	**9,61E-01**	**1,05E-01**	**3,25E-01**	**2,39E-01**	**1,42E-03**	**1,63E+00**	**1,06E-04**	**5,25E-02**	**5,39E+00**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	6,00E+00	4,73E-01	1,72E+00	2,56E+00	7,79E-01	**1,15E+01**	4,61E-03	1,33E+01	2,45E+01
	Used as raw materials	0,00E+00	5,82E-05	4,10E-01	0,00E+00	0,00E+00	**4,10E-01**	0,00E+00	0,00E+00	0,00E+00
	Total	**6,00E+00**	**4,73E-01**	**2,13E+00**	**2,56E+00**	**7,79E-01**	**1,19E+01**	**4,61E-03**	**1,33E+01**	**2,45E+01**
Secondary Material (g)		0,00E+00	0,00E+00	4,99E+01	0,00E+00	0,00E+00	**4,99E+01**	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	2,98E-02	0,00E+00	0,00E+00	**2,98E-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)		1,35E+02	1,74E-01	8,81E-01	9,46E-01	3,35E-02	**1,37E+02**	7,80E-03	1,09E+01	1,56E+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 domestic 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	9,45E+00	0,00E+00	**9,45E+00**	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	0,00E+00	9,20E+00	3,15E+00	2,96E+01	**4,19E+01**	1,22E+01	0,00E+00	0,00E+00
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	5,00E+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	**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**	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.*

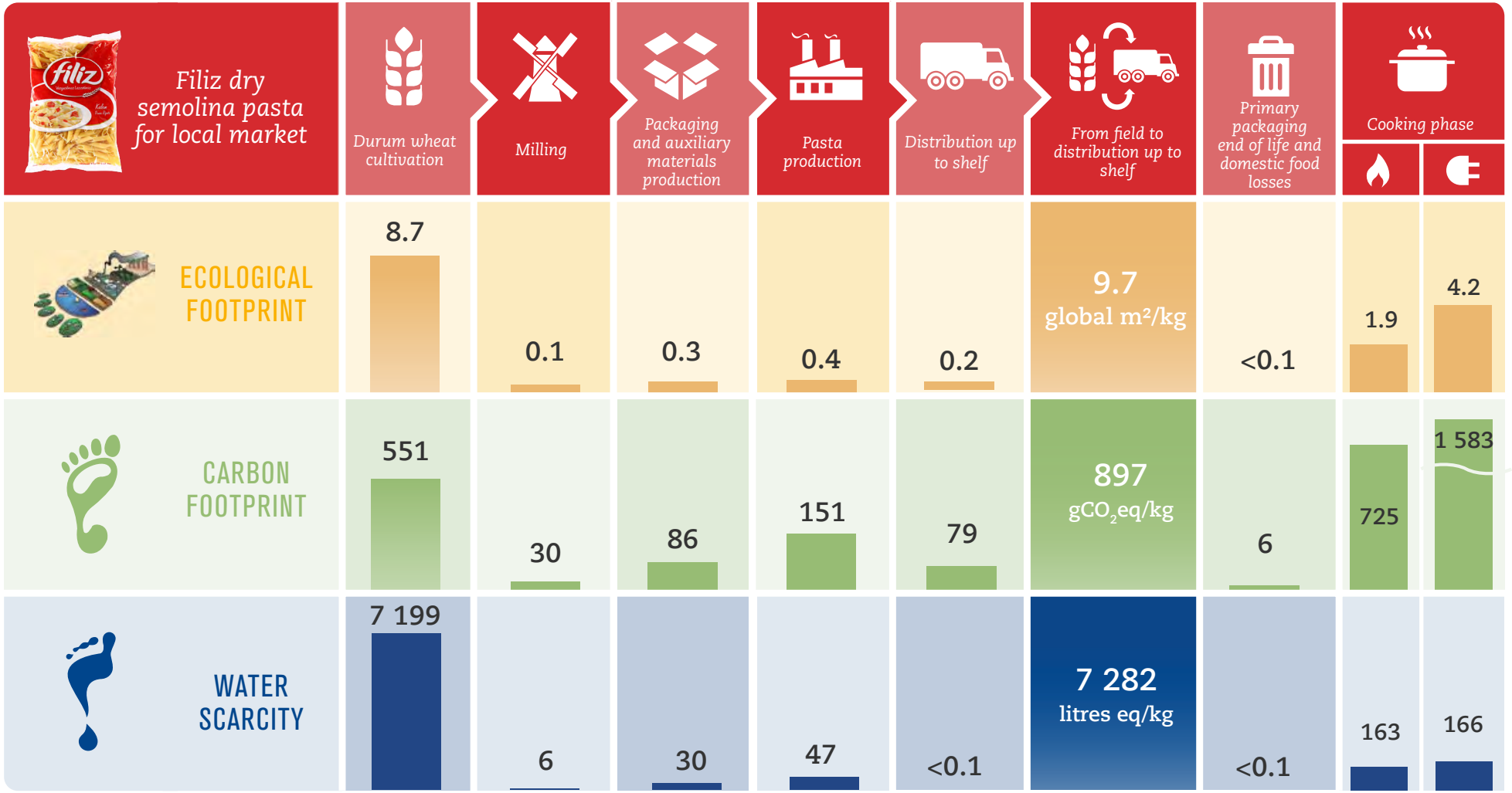
POTENTIAL ENVIRONMENTAL IMPACTS data referred to1 kg of product		UPSTREAM			CORE	DOWNSTREAM	TOTAL	USE STAGE		
		Durum wheat cultivation	*Milling*	*Packaging and auxiliary materials production*	*Pasta production*	*Distribution up to shelf*		*Packaging end of life and domestic food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	5,48E+02	3,04E+01	8,40E+01	1,50E+02	5,54E+01	**8,67E+02**	3,50E+00	7,24E+02	1,58E+03
	Biogenic	1,82E-01	9,81E-02	1,75E-01	8,26E-01	2,41E+01	**2,54E+01**	2,89E+00	2,60E-01	5,21E+00
	Land use and land transformation	2,80E+00	2,69E-03	1,46E+00	4,19E-03	7,83E-04	**4,26E+00**	1,13E-04	5,97E-02	1,37E-01
	Total	**5,51E+02**	**3,05E+01**	**8,56E+01**	**1,51E+02**	**7,95E+01**	**8,97E+02**	**6,39E+00**	**7,25E+02**	**1,58E+03**
Acidification Potential - g SO_2 eq		1,05E+01	1,21E-01	2,88E-01	3,25E-01	2,35E-01	**1,14E+01**	2,82E-03	6,19E-01	6,32E+00
Eutrophication Potential - g PO_4^{---} eq		8,07E+00	1,62E-02	7,84E-02	4,55E-02	4,52E-02	**8,26E+00**	3,45E-03	1,86E-01	9,61E-01
Photochemical Oxidant Formation Potential - gNMVOC eq		3,18E+00	9,21E-02	2,76E-01	2,70E-01	2,85E-01	**4,10E+00**	4,34E-03	6,35E-01	4,80E+00
Abiotic Depletion Potential - Elements g Sb eq		8,62E-04	1,07E-06	2,58E-05	2,47E-06	2,39E-06	**8,93E-04**	3,46E-08	7,65E-06	6,15E-05
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		5,86E+00	4,71E-01	1,98E+00	2,45E+00	7,77E-01	**1,15E+01**	4,46E-03	1,32E+01	2,44E+01
Water scarcity potential. m^3 eq		7,20E+00	6,13E-03	2,98E-02	4,73E-02	-1,45E-04	**7,28E+00**	2,08E-04	1,63E-01	1,66E-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 domestic food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
Hazardous waste disposed (g)*	0,00E+00	0,00E+00	1,19E-03	0,00E+00	0,00E+00	**1,19E-03**	0,00E+00	0,00E+00	0,00E+00
Non-Hazardous waste disposed (g)*	0,00E+00	0,00E+00	6,58E+00	0,00E+00	0,00E+00	**6,58E+00**	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed (g)	2,62E+04	7,80E+01	2,26E+03	9,97E+02	5,96E+03	**3,55E+04**	2,27E+01	6,98E+03	4,68E+03

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



11. Environmental results - Export market

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 domestic food losses	Pasta cooking, if gas	Pasta cooking, if electric
PRIMARY ENERGY RESOURCES - RENEWABLE data in MJ	Used as energy carrier	9,61E-01	1,05E-01	2,33E-01	2,39E-01	9,02E-03	**1,55E+00**	1,20E-04	8,44E-02	1,18E-01
	Used as raw materials*	0,00E+00	0,00E+00	9,24E-02	0,00E+00	0,00E+00	**9,24E-02**	0,00E+00	0,00E+00	0,00E+00
	Total	**9,61E-01**	**1,05E-01**	**3,25E-01**	**2,39E-01**	**9,02E-03**	**1,64E+00**	**1,20E-04**	**8,44E-02**	**1,18E-01**
PRIMARY ENERGY RESOURCES - NON RENEWABLE data in MJ	Used as energy carrier	6,00E+00	4,73E-01	1,72E+00	2,56E+00	5,61E+00	**1,64E+01**	5,16E-03	1,34E+01	3,13E+01
	Used as raw materials	0,00E+00	5,82E-05	4,10E-01	0,00E+00	0,00E+00	**4,10E-01**	0,00E+00	0,00E+00	0,00E+00
	Total	**6,00E+00**	**4,73E-01**	**2,13E+00**	**2,56E+00**	**5,61E+00**	**1,68E+01**	**5,16E-03**	**1,34E+01**	**3,13E+01**
Secondary Material (g)		0,00E+00	0,00E+00	4,99E+01	0,00E+00	0,00E+00	**4,99E+01**	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels (MJ. net calorific power)		0,00E+00	0,00E+00	2,98E-02	0,00E+00	0,00E+00	**2,98E-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)		1,35E+02	1,74E-01	8,81E-01	9,46E-01	2,38E-01	**1,38E+02**	7,85E-03	1,09E+01	1,64E+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 domestic 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	9,45E+00	0,00E+00	**9,45E+00**	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	0,00E+00	9,20E+00	3,15E+00	5,69E+00	**1,80E+01**	5,04E+00	0,00E+00	0,00E+00
Materials for energy recovery (g)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	5,00E+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	**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**	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 domestic food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
GLOBAL WARMING POTENTIAL - GWP ($g\ CO_2$ eq)	Fossil	5,48E+02	3,04E+01	8,40E+01	1,50E+02	4,01E+02	**1,21E+03**	4,19E+00	7,86E+02	1,60E+03
	Biogenic	1,82E-01	9,81E-02	1,75E-01	8,26E-01	5,96E+01	**6,09E+01**	2,89E+00	3,30E-01	2,42E-01
	Land use and land transformation	2,80E+00	2,69E-03	1,46E+00	4,19E-03	4,11E-03	**4,27E+00**	1,31E-04	1,18E-01	5,23E-02
	Total	**5,51E+02**	**3,05E+01**	**8,56E+01**	**1,51E+02**	**4,61E+02**	**1,28E+03**	**7,07E+00**	**7,87E+02**	**1,60E+03**
Acidification Potential - g SO_2 eq		1,05E+01	1,21E-01	2,88E-01	3,25E-01	2,16E+00	**1,33E+01**	3,15E-03	7,67E-01	1,24E+00
Eutrophication Potential - g PO_4^{---} eq		8,07E+00	1,62E-02	7,84E-02	4,55E-02	3,03E-01	**8,52E+00**	3,59E-03	1,98E-01	3,00E-01
Photochemical Oxidant Formation Potential - gNMVOC eq		3,18E+00	9,21E-02	2,76E-01	2,70E-01	2,31E+00	**6,13E+00**	4,96E-03	7,93E-01	1,56E+00
Abiotic Depletion Potential - Elements g Sb eq		8,62E-04	1,07E-06	2,58E-05	2,47E-06	1,66E-05	**9,08E-04**	3,62E-08	1,36E-05	1,30E-05
Abiotic Depletion Potential - Fossil fuels - MJ. net calorific value		5,86E+00	4,71E-01	1,98E+00	2,45E+00	5,60E+00	**1,64E+01**	4,98E-03	1,33E+01	3,12E+01
Water scarcity potential. m^3 eq		7,20E+00	6,13E-03	2,98E-02	4,73E-02	-1,17E-03	**7,28E+00**	2,09E-04	3,16E-02	1,20E-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 domestic food losses*	*Pasta cooking, if gas*	*Pasta cooking, if electric*
Hazardous waste disposed (g)*	0,00E+00	0,00E+00	1,19E-03	0,00E+00	0,00E+00	**1,19E-03**	0,00E+00	0,00E+00	0,00E+00
Non-Hazardous waste disposed (g)*	0,00E+00	0,00E+00	6,58E+00	0,00E+00	0,00E+00	**6,58E+00**	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed (g)	2,35E+02	2,56E+00	1,43E+02	1,70E+01	1,83E+02	**5,81E+02**	3,21E-01	1,24E+02	9,40E+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

Filiz dry semolina pasta for export 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 domestic food losses*	*Cooking phase*	
ECOLOGICAL FOOTPRINT	8.7	0.1	0.3	0.4	1.1	10.6 global m²/kg	<0.1	2.0	4.2
CARBON FOOTPRINT	551	30	86	151	461	1278 gCO_2eq/kg	7	787	1 595
WATER SCARCITY	7 199	6	30	47	<0.1	7 281 litres eq/kg	<0.1	32	120

Barilla
The Italian Food Company. Since 1877.

12. Difference versus previous versions of the 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.

Finally the Product Environmental Performance section has been modified with the substitution of Virtual Water Content with Water Scarcity indicator.

13. Additional information

REFERENCES

- International EPD Consortium, General Programme Instructions (EPD), ver. 3.01 of 18/09/2019;
- WWF, Global Footprint Network, Zoological Society of London, Living Planet Report 2008, WWF (2008);
- Arjen Y. Hoekstra, Ashok K. Chapagain, Maite M. Aldaya, Mesfin M. Mekonnen; Water Footprint The Water Footprint Manual 2011, Waterfootprint Network;
- PCR 2010:01; CPC 2371 - PCR for uncooked pasta, not stuffed or otherwise prepared; ver. 4.01 of 2021-09-20;
- Turkish court of Account Report. Waste Management in Turkey - National Regulations and Evaluation of Implementation Results Performance Audit Report. January 2007

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:
Laura Marchelli - laura.marchelli@barilla.com

Barilla
The Italian Food Company. Since 1877.

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

LCE

Barilla
The Italian Food Company. Since 1877.

14. 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 $PO_{4^{3-}}$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).