GENERAL PRINCIPLES FOR ENVIRONMENTAL COMMUNICATION ON MASS MARKET PRODUCTS

PART 28: METHODOLOGICAL GUIDE FOR THE ENVIRONMENTAL ASSESSMENT OF SPIRIT DRINKS

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FINAL REPORT

MENTION OF THIS REPORT

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TABLE OF CONTENTS

1. Background

This document is the sectoral repository which intends to provide a methodological framework for assessing the environmental impacts of spirit drinks.
This document is based on the items mentioned under Article 6 paragraph 1 of the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework (ADEME, 2016)
This repository is implemented as the sub-sectoral repository of the cross-sector repository for assessing the environmental impacts of consumer products, pursuant to Annex A.

The reasons specified hereinafter led to the drafting of this sectoral repository:

- The spirit drinks sector wishes to develop common methodological bases for assessing the life-cycle analysis of its products;
- The existing guidelines (cf. paragraph 2.2) do not provide sufficient details as to the specificity of spirit drinks, because of the large number of raw materials used, of distillation (specific to this sector) and the wide variety of products (46 categories included in the framework regulation 110/2008).

2. Prerequisites to drafting the repository

2.1. Creation of a working group and stakeholder representativeness

The working group set up to draft this document comprises producers, distributors, consultants and public authorities:

Fédération Française des Spiritueux (French Federation for Spirits)	Camille MARCHAND, Regulatory Affairs Officer Vincent MARTIN, Director General	organizer
RDC Environment	Alexis GERARD, Business Development Manager Rémi BAGARD, Life-cycle Analysis Expert	consultants / LCA experts
Pernod Ricard	Environmental Manager	stakeholders (producer)
Rémy-Cointreau	CSR Director	stakeholders (producer)
La Martiniquaise	Environmental Manager	stakeholders (producer)
Hennessy	Environmental Project Manager	stakeholders (producer)
LVMH	Environmental Manager	stakeholders (distributor)
ADEME	Edouard FOURDRIN, Products and Material Effectiveness Department	stakeholders (public authority)

Academics, NGOs, environmental groups and consumer associations are consulted via the general ADEME/AFNOR platform and during the consultation held in the Food Products WG1.

2.2. Bibliographic analysis

The bibliographic research carried out concluded that there was no PCR (Product Category Rules) document for spirit drinks.
Notwithstanding, two documents resembling a PCR somewhat were identified:

- BIER v3.0[1]
- The inventory of GHG emissions applicable to the spirit drinks sector and implementing the carbon accounting method.

The abovementioned documents, however, only focus on greenhouse gas emissions.
Be that as it may, European proposals on products that are, in particular, intermediate products of spirit drinks manufacturing are currently being drafted at European level [PEF[2] Wine and PEF Beer, for example]. Once the final versions of the European PEFCR[3] are validated by the European Commission, the methodological choices implemented in these European repositories (in particular relating to scope, to indicators and to allocation rules) shall prevail for similar products in the repository hereof, where relevant.
This shall be specifically mentioned during the initial review of the repository, to be undertaken within three years following its publication.
The following documents were analysed to draft the document hereof:

- General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework (ADEME, 2016);
- Specifications for drafting and reviewing sectoral repositories – ADEME / AFNOR PF Sept. 2014;
- Cross-sector repository for food products;
- PEF – 2013;
- BIER v3.0 – 2013;
- Envifood Protocol v1.0 – 2013;
- Inventory of greenhouse gas emissions applicable to the spirit drinks sector and implementing the carbon accounting method – 2011;
- FCD/ANIA/ADEME Pilot Project on Environmental Labelling – October 2010.

Moreover, Life-Cycle Analysis calculations (LCA) were carried out on 11 spirit drinks to corroborate the methodology decisions taken, as regards their influence on LCA results. The criteria for choosing the spirit drinks to be assessed included diversity in terms of products, formulations, age of the finished product, manufacturing processes and geographical origin.

Each of these spirit drinks were assessed based on real data provided by the producers concerned by this twofold life-cycle analysis / repository drafting approach.

1 Beverage Industry Sector Guidance for Greenhouse Gas Emissions Reporting – Dec. 2013

2 Product Environmental Footprint

3 Product Environmental Footprint Category Rule

3. Sectoral repository for spirit drinks

3.1. Purpose

This repository for the "spirit drinks" product category specifies the method to be used for calculating the indicators for environmental labelling. The purpose of environmental labelling is to:

- Inform consumers about the environmental impacts of the products they purchase;
- Channel consumers' demand towards products that are more eco-friendly;
- And, as such, encourage producers to eco-design their products more to reduce their impact on the environment.

The sectoral repository is an extension of the following repositories:

- Best Practices "General Principles for the Environmental Labelling of Consumer Products".
- Cross-sector repository for "food products".

The sectoral repository develops the items mentioned under Article A.1 paragraph 1 of the Best Practices repository. The Best Practices repository establishes as a guiding principle that the environmental impact assessment of products must be undertaken pursuant to the life-cycle approach and to the multi-criteria approach.

3.2. Scope

The products covered by this repository are spirit drinks as defined by Regulation (EC) n°110/2008 issued by the European Parliament and Council of 15 January 2008:

"'Spirit drink' means an alcoholic beverage:

a) intended for human consumption;
b) possessing particular organoleptic qualities;
c) having a minimum alcoholic strength of 15 % vol.;
d) having been produced:

i. Either directly:
- *by the distillation, with or without added flavourings, of naturally fermented products, and/or*
- *by the maceration or similar processing of plant materials in ethyl alcohol of agricultural origin and/or distillates of agricultural origin, and/or spirit drinks within the meaning of this Regulation, and/or*
- *by the addition of flavourings, sugars or other sweetening products listed in Annex I(3) and/or other agricultural products and/or foodstuffs to ethyl alcohol of agricultural origin and/or to distillates of agricultural origin and/or to spirit drinks, within the meaning of this Regulation,*

ii. or by the mixture of a spirit drink with one or more:
- *other spirit drinks, and/or*
- *ethyl alcohol of agricultural origin or distillates of agricultural origin, and/or*
- *other alcoholic beverages, and/or*
- *drinks".*

The CPA code related to these products is: **11.01 Distilling, rectifying and blending of spirits**, pursuant to version 2.1 of the classification of 1st January 2016.

As such, this repository does not cover food products which include spirit drinks in their composition, such as fruit macerated in eau de vie, which are not drinks, and also chocolate liqueurs.

3.3. Functional unit definition

The functional unit commonly defined for spirit drinks is:

Consume a quantity of a spirit drink containing the equivalent of a 10 g portion of pure alcohol.

This portion is the equivalent of a "standard" glass containing a unit of alcohol[4].

Function performed	Consume a spirit drink
Scale of the function	10 g of pure alcohol which corresponds to a unit of alcohol
Desired quality level	As consumed (cf. use scenario)
Product lifetime and use	Irrelevant[5]

Note: At the date of first publication of the repository, in the guidelines proposed for other alcoholic beverages, such as beer and wine, but not yet validated, different choices were specified for the functional unit: 75 cl (a bottle) in the PEF Wine draft and 1 hl in the PEF Beer draft.

To achieve harmonization between these functional unit choices which would provide a better comparison of these different products, the functional unit of 10 grams of pure alcohol may be converted into one volumetric unit by using a simple calculation.

Notwithstanding, it has been suggested that only the value of 10 g of alcohol can adequately reflect consumption habits by providing an opportunity to compare: 10 cl of wine at 12°, 3 cl of eau de vie at 37.5° and 25 cl of beer at 5° [source: alcool-info- service.fr]

No regulatory definition exists, however, for the notion of “standard glass”.

3.4. Reference flow

The reference flow is:

- The quantity of spirit drink equivalent to 10 g of pure alcohol which can be converted to volume pursuant to the following mathematical rule:

$$Standard\ glass\ volume\ (ml) = 12{,}67\ ml\ of\ pure\ alcohol\ /\ alcohol\ content$$

Note: the density of ethanol to be taken into account is 0.789 kg/litre. The functional unit can therefore be expressed as being 12.67 ml of pure alcohol.

- The packaging system of the spirit drink based on the volume of spirit drink equal to 10 g of pure alcohol

Example

As regards a 40% spirit drink, the reference flow will be:

$$Reference\ flow\ (ml) = \frac{12.67}{0.4} = 31.7\ ml$$

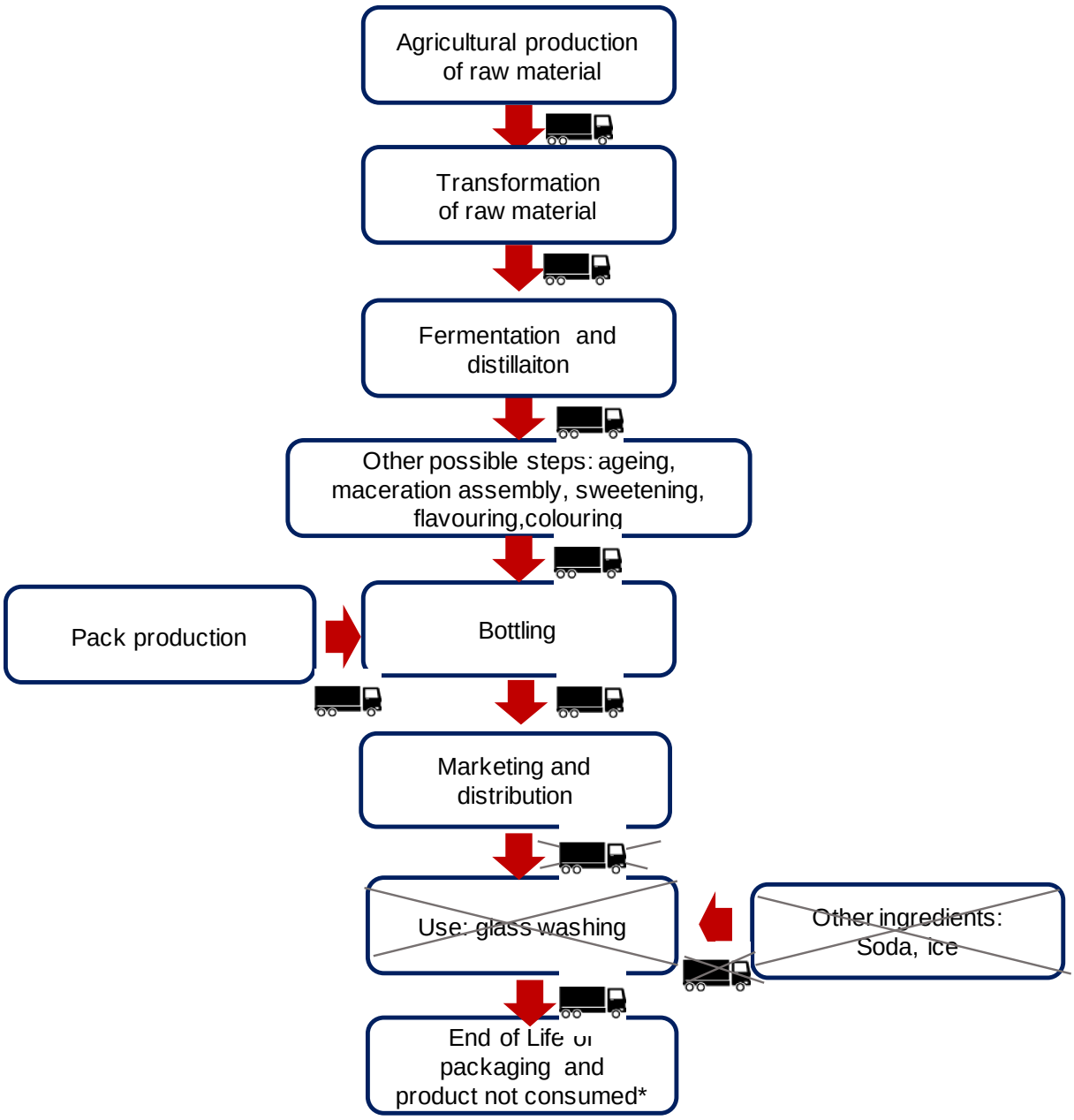
4. System boundaries

4.1. System boundaries

The scope of assessment for environmental labelling is illustrated here below:

[4] Consensual definition within the profession. This notion of standard glass is widely used for public health communication purposes in France.

[5] Spirit drinks do not have a regulatory obligation to include a use-by-date on labelling. They are specified in particular under Annex X of the Regulation 1169/2011 concerning the provision of food information to consumers, paragraph 1) subparagraph d.



* Food product waste includes:

- Avoidable materials (wastage) → Currently available data do not identify avoidable waste; this data should be included as soon as it becomes available.
- Non-avoidable materials = 0 for spirit drinks as a general rule (apart from some drinks that contain ingredients that are macerated (cinnamon, vanilla pods) that should be taken into account based on the following methodology: disposed of in France.

To understand the various steps better, please refer to the production diagram and to the definitions detailed under Annex 8.3.

4.2. Grounds for exclusion

Some steps of the spirit drink life-cycle are excluded from system boundaries. These steps are excluded for several reasons:

- **A step cannot be modelled**

  This occurs for flows where impacts are extremely difficult to quantify or difficult to allocate to the product portfolio of a company. In the case of spirit drinks, the flows as such excluded are:

- R&D-related flows;
- Flows related to employee home-to-work commuting and to business travel;
- Flows related to services linked to a product or a system such as advertising, canvassing, marketing, specifically as a result of the low environmental impact of these actions based on the functional unit as well as the difficulty in allocating advertising campaigns to a specific product and due to the considerable variety of existing actions.

This may also be related to impacts linked to customer consumption habits when occurrence does not depend on the product itself. In the case of spirit drinks, the flows as such excluded are:

- The other ingredients which could be consumed with the spirit drink and which are used in multifarious ways (e.g.: soft drinks, ice cubes, etc.).

- **Exclusion that complies with the food products repository guidelines**

The food products repository provides more specific guidelines on life-cycle steps that may be excluded. In the case of spirit drinks, the flow as such excluded is:

- Customer home-to-point of sale commuting.

- **Other exclusions**

The production and washing of glass used for drinking spirit drinks are also excluded. These steps do not generate any difference between the products and only lead to minimizing the relative variances between products.

5. Life-cycle inventory

5.1. Data structure and links with the IMPACTS Base ®

The WG took note of the sectors already covered by the Impacts Base ® at 1st September 2014.

5.1.1. Production of the raw materials for the formulation

In this section, the term “raw materials” means processed or unprocessed agricultural raw materials and ingredients as purchased by the operator.

		PCR								IMPACTS BASE
		Primary data		Semi-specific data		Secondary data				
								Generic inventory data		
Step	Sub-step	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Processes	Technical representativeness	Geographical representativeness
Production of the raw materials for the formulation	Agricultural products	- Type of the agricultural raw material - Quantity of the agricultural raw materials - Countries of origin of the agricultural raw materials		- Agricultural practices (conventional, organic). By default, conventional agricultural production is taken into account				- **Grain** production: wheat, rye, corn, barley, rice - Fruit and/or bulb production: grapes, plums, pears, apricots, quinces, raspberries, agaves, oranges, apples - Aromatic plants: coffee (proxy to be used) - Other raw materials: beet, sugar cane, potatoes	- conventional farming - organic farming	- National **Grains** Wheat → France, Sweden Rye → France, Poland Corn →France, Canada Barley → France, Ireland, United Kingdom Rice → France **Fruit** Apples, pears, plums, apricots, quinces, raspberries, cherries → France Grapes → France, Spain, Italy, Portugal **Bulbs** Agaves → Mexico Other agricultural raw materials: Beet and/or molasses → France Cane and/or molasses → Brazil, Madeira, DOM/TOM (French overseas departments and territories), Cuba Potatoes → France

	Sugar	- Quantity - Type of the agricultural raw material used for sugar production (beet, sugar cane)						- Beet sugar - Cane sugar	- Conventional farming	- Global average
	Ethyl alcohol of agricultural origin or a distillate	- Quantity - Type of the agricultural raw material (beet, sugar cane, grains, potatoes, wine, marc) - Countries of origin of the agricultural raw materials - Ethanol-producing countries		- Quantity of raw material - Heat/electricity consumption for ethanol production - Water consumption for ethanol production - Other inputs - Quantity of coproducts - Use of coproducts if they are recovered to produce energy The default data is presented under Annex 8.1				- raw material production - Electricity production and fuel combustion - Water production - Production of other inputs listed under Annex 8.1	- Conventional farming - Average electricity mix consumed - Combustibles that may be used[6]	- Beet: France - Rye: France, Poland - Wheat: France - Corn: France, USA - Cane: Brazil, DOM/TOM (French overseas departments and territories), Madeira, Cuba

[6] To make this table easier to read, the list of energy processes available are detailed in the Annex.

	Wine[7]	- Quantity - Countries of origin of the grapes - Wine-producing countries - Type of wine (white, red, rosé)		- Production yield (kg of grapes/hectolitre of wine) - Raw water consumption for the wine - Electricity consumption for the wine - Quantity of marc and lees - Quantities of other oenological inputs The default data is presented under Annex 8.1				- Grape production - Electricity production - Water production - Production of other inputs listed under Annex 8.1	- Conventional farming - Organic farming - Average electricity mix consumed	Countries of origin of the grapes: - France - Portugal - Italy - Spain Wine producing countries - France - Portugal - Italy - Spain
	Cider	- Quantity						- Cider production	- Conventional farming - Organic farming	- French average

[7] This item may be reviewed when the PEF Wine is published; operations controlled by the company must be taken into account: wine procurement and/or production.

	Malt	- Quantity - Countries of origin of the barley - Malt-producing countries		- Production yield (kg barley/kg malt) - Electricity consumption for malt production - Raw water consumption for malt production The default data is presented under Annex 8.1				- Barley production - electricity production - Heat production - Water production	- Conventional farming - Organic farming - Average electricity mix consumed	Countries of origin of the barley: - France - Ireland - United Kingdom Malt producing countries: - France - Ireland - United Kingdom
	Ethyl alcohol obtained from molasses	- Quantity - Type of the agricultural raw material used for molasses production (beet, sugar cane)						- Beet molasses alcohol - Cane molasses alcohol	- Conventional farming	- Global average
	Other inputs (flavours, syrups, etc.)	- Type of input - Quantity							- Conventional farming - Organic farming	- Global average

Note 1: When certain agricultural raw materials are lacking or when they come from first-stage processing included in the Impacts Base ®, LCI from Agribalyse and from Acyvia should be used. In the future, when the repository is reviewed, this data will already have been integrated into the Impacts Base ® and only this base is intended for use when calculating for environmental labelling purposes;

Note 2: Apart from sugar, products that have been processed (ethanol, wine, cider, malt, etc.) are considered as not being under the control of the operator undertaking the LCA of their product (input procurement). Semi-specific data is proposed under Point 8.1 of the repository hereof. It should be noted that no allocation rule has been applied to the data made available under Point 8.1 and the appropriate allocation rule should be applied based, in particular, on data also provided on coproducts under Annex 8.1.
Note 3: When an operator uses a processed input, for example, “vinous ethanol”, semi-specific data may be used as it is assumed that the operator does not “control” the processing step (distillation in the case of ethanol). In contrast (see paragraph 5.1.4 hereinafter), when the operator controls the processing step, specific data should be used.

5.1.2. Packaging production

		PCR						IMPACTS BASE		
Step	Sub-step	Primary data		Semi-specific data		Secondary data				
		Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness

Packaging production	Primary packaging	- Material - Weight of primary packaging by material per functional unit - Transformation process for plastic materials *Origin is not mandatory as the data taken into account refers to European averages.*		- Incorporation rate for recycled material. By default, 0% incorporation is taken into account for recycled material. - Number of uses for reuse modelling. Default value: 2 uses *This data is only to be collected for material where the allocation factor for recycling benefits include an incorporation benefit: plastic, wood, textile*				**Raw material production:** - Glass - Aluminum - LDPE - HDPE - PET - Cork - Wax - Paper - Cardboard - Wood (Ink is below the endpoint condition). **Transformation of plastic materials** - Cardboard box production - Plastic injection - Film blowing - Aluminum sheet production - LDPE film extrusion	- Production of virgin material for all materials - Production of 100% recycled material for plastics (HDPE and LDPE) - Market average	- European average - European average

	Secondary packaging	- Material - Weight of secondary packaging by material, per functional unit *Origin is not mandatory as the data taken into account refers to European averages.*				- Incorporation rate for recycled material. By default, 0% incorporation is taken into account for recycled material.		**Raw material production:** - LDPE - Corrugated cardboard	- Average	- European average
	Tertiary packaging	- Pallet quantity per functional unit - Weight of tertiary packaging by material per functional unit *Origin is not mandatory as the data taken into account refers to European averages.*				- Weight of LDPE film related to a pallet: 500 g/pallet - Number of times a pallet is used: 15		**Packaging production** - LDPE - Pallet	- Average	- European average

5.1.3. Transportation

		PCR						IMPACTS BASE		
		Primary data		Semi-specific data		Secondary data				
								Generic inventory data		
Step	Sub-step	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Processes	Technical representativeness	Geographical representativeness
Transportation	Transportation of agricultural raw materials for first-stage processing of the agricultural raw materials	- Means of transport (truck, boat, plane, train) - Transport temperature (refrigerated or not)		- Transport distance: best practice scenarios (ADEME, 2016) - Rate of use. Default value is 50% (assuming outbound full, inbound empty)				Freight transported by truck, boat, plane and train	**Truck** - Average fleet **Boat** - Bulk maritime transport - Waterway transport by motor-vessel **Plane** - Long-haul air transport **Train** - Average	**Truck** → National average fleet (if same country) → continental average fleet if different countries **Boat** - Maritime → global average - Waterway → European average **Plane** - Global average **Train** - National average (if same country) - Continental average if different countries

	Transportation of ingredients and agricultural materials to the distillery	- Means of transport (truck, boat, plane, train) - Transport distance - Transport temperature (refrigerated or not)		- Rate of use. Default value is 50% (assuming outbound full, inbound empty).				Freight transported by truck, boat, plane and train	**Truck** - Average fleet **Boat** - Bulk maritime transport - Waterway transport by motor-vessel **Plane** - Long-haul air transport **Train** - Average	**Truck** → National average fleet (if same country) → Continental average fleet if different countries **Boat** - Maritime → global average - Waterway → European average **Plane** - Global average **Train** - National average (if same country) - Continental average if different countries

	Transportation to bottling facility	- Means of transport (truck, boat, plane, train) - Transport distance - Transport temperature (refrigerated or not)		- Rate of use. Default value is 70% (average value for trucks in Europe according to Eurostat).				Freight transported by truck, boat, plane and train	**Truck** - Average fleet **Boat** - Bulk maritime transport - Waterway transport by motor-vessel **Train** - Average	**Truck** → National average fleet (if same country) → Continental average fleet if different countries **Boat** - Maritime → global average - Waterway → European average **Train** - National average (if same country) - Continental average if different countries
	Transportation to distribution centres	- Means of transport (truck, boat, plane, train) - Transport distance		- Rate of use. Default value is 70% (average value for trucks in Europe according to Eurostat).		Carried at ambient temperature		Freight transported by truck	**Truck** France →rated load 34-40 t Other → average fleet	**Truck** → French average fleet (if bottling in France) → Continental average fleet if different countries

	Transportation to points of sale[8]					- Transported by truck - Distance: 300 km - Rate of use: 70% (average value for trucks in Europe according to Eurostat). - Ambient temperature		Freight transported by truck	**Truck** →Rated load 34-40 t	**Truck** → French average fleet

[8] Distribution via e-commerce could lead in particular to modification of this data. This point shall be reviewed as a priority when the repository is reviewed for the first time, in particular when further data is made available for the sector as regards this practice.

5.1.4. Processing

		PCR						IMPACTS BASE		
		Primary data		Semi-specific data		Secondary data				
								Generic inventory data		
Step	Sub-step	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Processes	Technical representativeness	Geographical representative-ness
Processing	Fermentation and distillation (when these steps are carried out in the same facility) Otherwise, start with the agricultural material that has undergone first-stage processing when applicable	- Energy consumption [9](fuel and electricity) - Distillation country - Raw water consumption and origin (ground, river, network, rain) - Existence of effluent treatment (internal, external or no treatment prior to discharge) - Consumption of other inputs not included in the formulation - Quantity of waste generated by the facility and waste	- Quantity of alcohol per FU, taking into account losses through maturing and bottling - Quantity of effluents and discharge environment (river, sea) - Quantity of coproducts	Effluent pollutant load in nitrates, phosphates and COD released from the facility. Default values: - COD: 2,000 g/m³ - Nitrates: 50 g/m³ - Phosphates: 50 g/m³	Effluent pollutant load in nitrates, phosphates and COD released from the facility. Default values: - COD: 2,000 g/m³ - Nitrates: 50 g/m³ - Phosphates: 50 g/m³	- Pollution reduction rate in external WWTPs. Default values: COD: 90% Nitrates: 75% Phosphates: 65% - Biogenic CO_2 emissions during fermentation based on the chemical equation of converting		Electricity production and fuel combustion Water pumping[10]	**Energy - fuel** 1) By type: fuel, natural gas, coal, propane, wood 2) By boiler size → > 100 kW 3) For a quantity of fuel consumed and not by quantity of steam energy produced **Water pumping** - Network water - Groundwater pumped - River water pumped	**Energy** - Electricity → national - Fuel → continental **Water pumping** - National

[9] List specified under Annex 8.1.3.

[10] Whenever water is pumped by the distillery itself, check that it is not counted twice. The likelihood exists that energy consumption is considered in the water pumping process but also in distillery consumption.

		management system used				glucose into ethanol.				
	Maceration									

Note : Specific primary data must be taken into account for the processing steps as it is deemed that the operator “controls” the step, in particular as regards distillation.

5.1.5. Maturing

		PCR						IMPACTS BASE		
		Primary data		Semi-specific data		Secondary data				
								Generic inventory data		
Step	Sub-step	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Processes	Technical representativeness	Geographical representative-ness
Maturing		- Energy consumption (fuel and electricity) - Maturing country - Water consumption and origin (ground, river, network, rain) - Number of times the casks are used - Cask volume capacity - Mass and type of materials used for the casks	- Quantity of alcohol per FU, taking into account losses through bottling - Quantity of pure alcohol evaporated during maturing		- Quantity of pure alcohol evaporated during maturing. By default, 2% per year is taken into account based on the residual quantity of pure alcohol. 2% corresponds to maturing in a temperate country. *The evaporated ethanol is modelled as ethanol emission in air.*			Electricity production and fuel combustion Water pumping **Casks** Wood production Steel production	**Energy - fuel** 1) By type: fuel, natural gas, coal, propane, wood 2) By boiler size → > 100 kW 3) For a quantity of fuel consumed and not by quantity of steam energy produced **Water pumping** - Network water - Groundwater pumped - Riverwater pumped **Casks** Wood → oak Steel → average	**Energy** - Electricity → national - Fuel → continental **Water pumping** - National **Casks** Global average

Example of an ethanol evaporation calculation using the default value

In the case where a producer sends 1,000 litres of spirit drink at 70% volume for maturing over 5 years, the losses calculated with the default data equal 67 litres. The calculation is detailed hereinafter.

$$pure\ alcohol\ losses = initial\ quantity\ of\ alcohol\ casked * (1 - 98\%^{maturing\ period}) = (1{,}000 * 70\%) * (1 - 98\%^{5}) = 700 * 9.6\% = 67\ litres$$

When maturing takes place in a country considered as tropical, this formula should be modified by adding a “climate factor”, which introduces differentiation with higher evaporation as a result of the heat and partial pressure of water in air.
This coefficient could not be determined when the repository was initially drafted. Operators concerned may propose a coefficient based on the actual situation.
The way ethanol emissions should be taken into account is detailed in Chapter 5.5.

Methodological note: impacts related to maturing equipment (casks, etc.) are to be taken into account based on the number of times the casks/barrels are reused and their capacity.

5.1.6. Bottling

		PCR						IMPACTS BASE		
Step	Sub-step	Primary data		Semi-specific data		Secondary data				
		Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Generic inventory data		
								Processes	Technical representativeness	Geographical representativeness
Bottling		- Energy consumption (fuel and electricity) - Bottling countries - Raw water consumption and origin (ground, river, network, rain)						Electricity production and fuel combustion Water pumping	**Energy - fuel** 1) By type: fuel, natural gas, coal, propane, wood 2) By boiler size → > 100 kW 3) For a quantity of fuel consumed and not by quantity of steam energy produced **Water pumping** - Network water - Groundwater pumped - River water pumped	**Energy** - Electricity → national - Fuel → continental **Water pumping** - National

5.1.7. Distribution centres and points of sale

Step	Sub-step	PCR						IMPACTS BASE		
		Primary data		Semi-specific data		Secondary data				
		Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Activity data, to be linked to database inventory data	Elementary flows and data not directly linked to the database	Generic inventory data		
								Processes	Technical representative-ness	Geographical representative-ness
Warehouse and sale	Distribution centre					- Average distribution centre storage time: 4 weeks - Volume occupied by the product: 4 times the spirit drink volume (content) - Type of storage: - ambient temperature - Energy consumption: Electricity: 15 kWh/m³ per year Gas: 180 MJ/m³ per year		Electricity production and fuel combustion	**Energy - gas** 1) By type: fuel, natural gas, coal, propane, wood 2) By boiler size → > 100 kW 3) For a quantity of fuel consumed and not by quantity of steam energy produced	**Energy** - Electricity → national - Fuel → continental
	Point of sale[11]					- Average point-of-sale storage time: 4 weeks - Volume occupied by the product: 4 times the spirit drink volume (content) - Type of storage: - ambient temperature - Electricity consumption: 300 kWh/m³ per year				**Energy** - Electricity → national

[11] Distribution via e-commerce could lead in particular to modification of this data. This point shall be reviewed as a priority when the repository is reviewed for the first time, in particular when further data is made available for the sector as regards this practice.

5.1.8. Use

The use step is excluded from the spirit drink life-cycle; as such, there is no inherent data for this step.

5.1.9. End-of-life

As mentioned in the Chapter on exclusions, there is hardly any food wastage data available. As spirit drinks are exempted by the INCO Regulation 1169/2011 from the obligation to indicate a date of minimum durability, spirit drinks are not wasted. Some products are commercialized with commodities or spices which are not consumed as such. An end-of-life should be modelled in France, as specified in paragraph 5.3.1.
The packaging system end-of-life is modelled as specified in paragraph 5.3.2.

5.2. Allocation rules

Notes:

1. *Upstream steps, specifically dedicated to a coproduct are allocated 100% to it (for example, energy consumption for drying coproducts);*
2. *Biogenic carbon capture and emissions follow actual physical flows. Allocating the capture of biogenic carbon between the product and the coproduct reflects the ratio of carbon that is actually contained in these two items.*

Due to the diversity of spirit drink production processes, it is not reasonably possible to describe all the product/coproduct nodes which may be detected or to define rules for every single one of them. Notwithstanding, several of these nodes have been studied in depth and are presented in the paragraphs hereinafter.
To gain a better understanding, here are a few of the nodes detected:

- During the agricultural step: grapes/stalks etc.;
- During fermentation: wines/marcs and lees;
- During distillation: grain brandy/distiller's grains [allocation rule]; wine spirit/distillery residues processed by anaerobic digestion [no allocation rule];
- During the production of ethyl alcohol of agricultural origin (EAAO) from beet: EAAO/sugar and molasses;
- During the production of ethyl alcohol of agricultural origin (EAAO) from sugar cane: EAAO/sugar and molasses;
- During rectifying distillation: eau de vie (spirit)/residues;
- Etc.

5.2.1. Allocation during agricultural production

The allocations chosen for agricultural raw material production are the ones proposed in the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework; i.e. in line with the rules established for the Agribalyse database.

5.2.2. Allocation between alcohol and distiller's grains during grain distillation

The distillation of grain alcohol from grains results in the production of the "distiller's grain" coproduct.
Given the diversity for optimizing coproducts and the lack of reliable data as regards practices currently used around the world for recovering distiller's grains (distillery situation, corporate strategy, potential market, raw material prices, etc.), allocation cannot be ruled out.
For this allocation, the ADEME recommends economic allocation whereas the French spirit drinks sector would like to implement the mass allocation rule based on dry substance.
A sensitivity study was undertaken on a specific case but the impact results for the products studied are relatively sensitive to the allocation rule chosen and do not lead to any clear conclusion.
As no agreement was reached between the ADEME and the French spirit drinks sector, it was decided not to define the allocation rule between grain distillation products and coproducts as regards the repository hereof. Companies wishing to implement environmental labelling for their products must, as such, refer to the general standard for the methodological choice of an allocation rule.
As this position is not satisfactory for the purpose of providing consumers with a framework for comparing various spirit drinks, the different stakeholders agreed that this point must be prioritized when the repository is subsequently reviewed in the near future.

5.2.3. Allocation between wine, marc and lees during vinification

For national consistency, the rule proposed through the Acyvia approach is applicable to this allocation node, until the European Commission validates the PEF Wine. As of then, the European rule shall prevail.

5.2.4. Allocation during rectifying distillation[12]

For calculating environmental labelling for spirit drinks, mass allocation based on dry substances is used for ENA produced from rectifying distillation.

5.2.5. Allocation during vinous ethanol production

For national consistency, the rule proposed through the Acyvia approach is applicable to this allocation node.

5.2.6. Allocation during beet ethanol production [12]

For calculating environmental labelling for spirit drinks, mass allocation based on dry substances is used for ethyl alcohol of agricultural origin (EAAO) produced from beet distillation.

5.2.7. Allocation of the excess production of energy

The recovery of heat/electricity potentially coproduced is implemented by extending the system.

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12 *For these two nodes, allocation cannot be ruled out and the purposes of the products and coproducts are different, according to the ADEME's methodology. In this instance, the ADEME recommends economic allocation.*

A sensitivity study was undertaken and the conclusions show that the impact results for spirit drinks are not sensitive to allocation rules. To make it easier to implement environmental labelling of spirit drinks – and only within this framework – and due to the difficulty of accessing economic data, it is proposed that mass allocation based on dry substance be used as it returns results which are very close to an economic allocation for these two nodes. This methodological choice does not apply when coproducts from these two nodes are studied.

5.3. Procedures for taking end-of-life into account

This step is based on the guidelines defined under the food products repository.
The end-of-life step is taken into account. It refers to the product when it is not consumed and to packaging. It is specific to the country where end-of-life takes place.

5.3.1. Commodity waste

It is assumed that all of the spirit drink contained in the sales packaging is consumed. No commodity wastage during the use step should be taken into account as such, except in the case where a commodity or a spice is commercialized in the product (vanilla, fruit, etc.). In this instance, the waste is considered as eliminated. The average incineration and landfill rates for France are taken into account. The models used to allocate the impacts and the benefits related to the end-of-life of materials are appended to the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework.
As regards organic waste generated during distillation or first-step processing, a cross-sector approach should ideally be developed at cross-sector food products repository level. This approach should specify the following parameters for the different biological treatments (spreading, composting, anaerobic digestion):

- Default energy consumption,
- Default equipment/facility,
- What happens to carbon, nitrogen, phosphorus and potassium elements during these treatments (models to be used).

Due to a lack of common data, these treatments must be modelled on a case-by-case basis.

5.3.2. Primary packaging waste

For primary packaging, modelling must be based on behavioural and treatment mode average. Models and secondary data come from the database implemented for environmental labelling.
As such, for a given product:

1. The average recycling rate for the given packaging material is taken into account. For the recycled fraction, the appropriate calculation from the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework is used.
   i. Bottle and canister

   The bottle and, if applicable, the canister are the main primary packaging components. It is these fractions that are likely to be recycled. The data to be taken into account is reproduced in the table hereinafter.

Material	Recycling rate
Glass	73.5%
Aluminium	28.5%
PET	52.2%
Steel	63.1%
Cardboard	63.5%

   Source: LCA method note – Technical rate for packaging waste recycling based on the materials, Ademe and Ecoemballages (October 2014).

   ii. Other primary packaging components

   Other primary packaging components such as labels, plastic film, stoppers and caps are considered as eliminated.

2. For the non-recycled fraction of packaging, the average incineration and landfill rates for France are taken into account. The models used to allocate the impacts and the benefits related to the end-of-life of materials are appended to the General Principles for the

Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework.

Due to a lack of accurate data as regards energy recovery rates through incineration and non-hazardous waste landfills, the following values apply.

Parameters	Data
Incinerator energy recovery rate[13]	19.5% thermal 8.5% electric
Non-hazardous waste landfill biogas recovery rate	Disregarded

5.3.3. Secondary and tertiary packaging waste

In France, outer cardboard (cardboard used for grouping together primary packaging in clusters) and palletizing film-wrap are secondary and tertiary packaging of which a certain percentage is recycled. **It is advisable to use the commercial packaging recycling rate from the ADEME database** or the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework, **as well as the non-recycled packaging treatment rates (incineration with energy production, straight incineration, landfilling, composting, etc.)**.
The data to be taken into account is reproduced in the table hereinafter.

Material	Recycling rate	Source
Corrugated cardboard	99.5%	ADEME Ecoemballages Note (2014)
Plastic films	28.8%	
Pallet	80%	Assumption

5.4. Taking carbon emission time-lag into account

Greenhouse gas emission time-lag is not taken into account for spirit drinks.

5.5. Taking biogenic carbon flows into account

The elementary flows of biogenic-sourced CO_2 are neutral between the capture of plant-based raw materials through photosynthesis and CO_2 emissions during the drink processing, maturing and digestion steps. Moreover, coproduct-related biogenic carbon flows are allocated to the coproduct system on the basis of their carbon content.
As such, the biogenic CO_2 flow must be considered as neutral throughout the life-cycle. Two approaches may be followed:

- Excluding the biogenic CO_2 flows. In this instance, the GWP [14]for methane emitted from the biogenic carbon should be adjusted.
- Including all physical biogenic carbon flows, taking into account:
    - The indirect impact on the greenhouse effect from ethanol emissions during maturing,
    - The “end-of-life” of the spirit drink consumed, as an emission in the form of biogenic CO_2 for all the carbon contained in the spirit drink.

    In both cases, modelling is based on the ethanol carbon content and the molar mass ratios.

    $$C_2H_6O \rightarrow 2\,CO_2$$

    For 1 gram of ethanol emitted, the indirect impact on the greenhouse effect is 88/46 g CO2 equivalent.

[13] Calculated based on ADEME ITOM (Domestic waste treatment facilities) 2012 figures, taking into account an average NCV for waste treated in a domestic waste incineration facility of 9 MJ/kg.

[14] Global Warming Potential

Given the lack of difference as regards the total result, it is recommended to exclude the biogenic CO_2 flow to facilitate calculations.

6. Characterization

6.1. Factors causing impacts

The steps and/or parameters that contribute the most to environmental impact indicators are detailed in the table hereinafter.

Environmental indicator	Key contributions
Climate change	1. Production of primary packaging 2. Production of agricultural raw materials 3. Distillation 4. Transportation to distribution centres
Destruction of the ozone layer	1. Production of primary packaging 2. Production of agricultural raw materials 3. Distillation 4. Transportation to distribution centres
Human toxicity, carcinogenic effects	1. Production of agricultural raw materials 2. Production of primary packaging 3. Transportation to distribution centres
Human toxicity, non-carcinogenic effects	1. Production of primary packaging 2. Production of agricultural raw materials 3. Transportation to distribution centres 4. Distillation
Acidification	1. Production of agricultural raw materials 2. Production of primary packaging 3. Distillation
Inorganic particle emissions	1. Production of agricultural raw materials 2. Production of primary packaging 3. Distillation
Aquatic ecotoxicity (freshwater)	1. Production of agricultural raw materials
Ionizing radiation	1. Production of primary packaging 2. Points of sale 3. Bottling 4. First-step processing
Photochemical pollution	1. Maturing
Terrestrial eutrophication	1. Production of agricultural raw materials 2. Production of primary packaging

	3. Distillation
Aquatic eutrophication (freshwater)	1. Production of agricultural raw materials 2. Production of primary packaging 3. First-step processing
Aquatic eutrophication (marine water)	1. Production of agricultural raw materials 2. Production of primary packaging
Conversion of land	1. Production of agricultural raw materials
Depletion of water resources	1. Production of agricultural raw materials 2. Production of primary packaging 3. Distillation 4. First-step processing
Depletion of non-renewable natural resources	1. Production of primary packaging 2. Production of agricultural raw materials 3. Transportation to distribution centres

6.2. Environmental impact indicators and calculation methods

Environmental impact indicators to be quantified for spirit drinks are included in the list used for the cross-sector "food products" repository, i.e.:

- Climate change;
- Depletion of water resources;
- Water quality – Marine water eutrophication.

The methods to apply for calculating these impacts are detailed in the table hereinafter. They are consistent with the guidelines of the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework.

Indicators	**Unit for environmental labelling**	**Indicators to calculate during environmental assessment**	**Indicators to indicate for environmental communication**
Climate change	g CO_2 equivalent	Compulsory	Compulsory
Aquatic eutrophication (marine water)	g N equivalent	Compulsory	Compulsory
Depletion of water resources	litre equivalent	Compulsory	Compulsory
Aquatic ecotoxicity (freshwater)	Comparative Toxic Unit for ecosystems (CTU_e)	Optional	Not applicable

Notes:

1. The spirit drinks sector recognizes the importance of the environmental impact issues related to agricultural production and to raw materials used in its products.
    a. As regards the biodiversity indicator: the impact from agricultural upstream activities and, in particular, from monocultures on biodiversity is proven and is an important issue for all agricultural products. The repository hereof, however, has been drafted without any reliable and acknowledged indicator for measuring this impact. If such an indicator was proposed, the list of indicators used, which are to be quantified and indicated, could be reviewed. Meanwhile, operators are invited to integrate, insofar as possible, the issue of the impact of their products on biodiversity by contributing, for

example, to projects researching the impact of the cultivation of agricultural raw materials used in spirit drinks on ecosystems. It should be noted that “local”, “regional” and “field” approaches are developed by different French and international bodies. These approaches may be of help for companies for taking the biodiversity issue into account.

b. As regards the aquatic ecotoxicity indicator (freshwater): it has been established that the impact from agricultural upstream activities on the aquatic ecosystem is an important issue for processed agricultural products. However, the characterization method recommended (USEtox) for the indicator of this impact at the date of publication of the repository hereof contains a high level of uncertainty (in particular as regards inorganic substances). As one of the purposes of the repository hereof is its use as a methodological reference for environmental labelling, in particular, for guiding consumers towards products that are more eco-friendly, it has been decided that the “aquatic ecotoxicity” indicator should not be selected.
Notwithstanding, stakeholders and companies using this repository are encouraged to check the agricultural best practices implemented by their suppliers, to calculate the aquatic ecotoxicity indicator for pedagogical purposes, without indicating it, and to help improve the characterization of impacts on the aquatic ecosystem of the production of raw materials used in products.

2. As the indicator concerning water consumption mentioned in the food product repository is no longer in line with the one mentioned in the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework, the indicator specified in the document hereof is, as such, used.

The methods used for characterizing the environmental impacts are detailed in the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework.
The choice of indicators may be reviewed in the light of choices set out in the PEF Wine.
The analysis of the relevance of the different environmental indicators as regards the spirit drink repository is detailed under Annex 8.2.

7. Sectoral repository validation

7.1. Consultation deadlines

The consultation deadlines of 4 weeks for Food Products WG1 and 6 weeks for the general ADEME/AFNOR platform were complied with.

7.2. Validation

The repository hereof was validated during the cross-sector environmental labelling platform meeting of 1st June 2016. It led to the drafting of a critical review report.

7.3. Period of validity for a repository

Sectoral repositories are valid for 3 years once they have been adopted for the first time. At the end of this period, the working group assesses whether the sectoral repository needs to be reviewed or not. This process is then renewed every 5 years.

It should be noted that, within the framework this first version of the repository, several important decision points were deferred to the first review of the repository, given the data and knowledge available and the stakeholders' positions, in particular as regards the grain brandy/distiller's grains allocation rule and the consideration of e-commerce.

8. Annexes

8.1. Semi-specific data proposed for the repository

8.1.1. Intermediate processing

Introductory note: the data for the intermediate processing hereinafter may be used when these steps are not under the control of the operators undertaking the LCAs of their products. In the event where these processes are under operators' control, specific data must be used.
Important: the data hereinafter is to be taken into account before the allocation rules are applied. The allocation rule to be applied should be defined in line with Acyvia and the coproduct-related data, presented in the tables hereinafter, should be used.

Malting
The semi-specific data proposed is drawn from existing literature. The main data source is the *Agribusiness handbook – Barley, malt, beer – FAO* report.

Parameters	Data
Barley consumption	1.27 kg of barley/kg of malt
Electricity consumption	0.15 kWh/kg of malt
Gas consumption	0.9 kWh/kg of malt
Water consumption	8 litres/kg of malt
Effluents	
Coproducts (barley hulls)	50 g/kg of malt Percentage of dry substance: 50%

Vinification
Within the framework of the Acyvia project, wine production data must be compiled in partnership with the French Wine and Vine Institute (IFV).
As soon as Acyvia makes its wine production data available, this data must be used. Until this data is made available, the values hereinafter apply.

Parameters	Data
Quantity of grapes	143 kg of grapes/hectolitre of wine
Electricity consumption	15 kWh/hectolitre of wine
Water consumption	100 litres/hectolitre of wine
Quantity of marc and lees	20 kg de grape marc / hl of wine 2 kg of wine lees / hl of wine

Vinous ethanol production

Within the framework of the Acyvia project, vinous ethanol production data must be compiled in partnership with the Union Nationale des Groupements de Distillateurs d'Alcool (National Union of Alcohol-Distillers Groups - UNGDA).
Until this data is made available, the values hereinafter apply.

Parameters	Data	Unit
Quantity of wines	1,194	kg/hectolitre of pure alcohol
Electricity consumption	8.07	kWh/hectolitre of pure alcohol
Heat consumption	695	MJ/hectolitre of pure alcohol
Water consumption	50	litres/hectolitre of pure alcohol
Nitric acid	0.094	kg/hectolitre of pure alcohol
Soda	0.19	kg/hectolitre of pure alcohol
Bleach	00124	kg/hectolitre of pure alcohol
VOC emissions	0.352	kg/hectolitre of pure alcohol
Common waste	0	kg/hectolitre of pure alcohol
Quantity of coproducts *Distillery residues* (+percentage of dry substances)	 1,112 3	 kg of distillery residues/hectolitre of pure alcohol %

Beet ethanol production

The semi-specific data proposed is drawn from exchanges with the Union Nationale des Groupements de Distillateurs d'Alcool (National Union of Alcohol-Distillers Groups - UNGDA).

Parameters	Data	Unit
Quantity of beet	900	kg of beet/hectolitre of pure alcohol
Electricity consumption	20	kWh/hectolitre of pure alcohol
Heat consumption	350	MJ/hectolitre of pure alcohol
Water consumption	90	litres/hectolitre of pure alcohol
Sulphuric acid consumption	2.4	kg/hectolitre of pure alcohol
Diammonium phosphate consumption	0.5	kg/hectolitre of pure alcohol
Sodium sulphate consumption	0.5	kg/hectolitre of pure alcohol
Quantity of coproducts *Sugar* *Distillery residues* (+percentage of dry substances)	 - 560 40	 kg of sugar/hectolitre of pure alcohol kg of distillery residues/hectolitre of pure alcohol %

Marc ethanol production

The semi-specific data proposed is drawn from exchanges with the Union Nationale des Groupements de Distillateurs d'Alcool (National Union of Alcohol-Distillers Groups - UNGDA).

Parameters	Data	Unit
Quantity of marc	3,300	kg/hectolitre of pure alcohol
Electricity consumption	54.7	kg of beet/hectolitre of pure alcohol
Heat consumption	2,170	MJ/hectolitre of pure alcohol
Water consumption	1,912	litres/hectolitre of pure alcohol
Fuel consumption	0.194	MJ/hectolitre of pure alcohol
Consumption of chemical inputs (specify the type and quantity)		kg/hectolitre of pure alcohol
Nitric acid	0.01	kg/hectolitre of pure alcohol
Soda	0.0449	kg/hectolitre of pure alcohol
Sulphuric acid	0.405	kg/hectolitre of pure alcohol
VOC emissions	2.22	kg/hectolitre of pure alcohol
Common waste	0.57	kg/hectolitre of pure alcohol
Quantity of coproducts *Distillery residues* (+percentage of dry substances) *Spent stalks and marc* (+percentage of dry substances)	 2,641 4 3,117 60	 kg of distillery residues/hectolitre of pure alcohol % kg/hectolitre of pure alcohol %

Grain ethanol production (non-valid for malt ethanol)

The semi-specific data proposed is drawn from exchanges with the Union Nationale des Groupements de Distillateurs d'Alcool (National Union of Alcohol-Distillers Groups - UNGDA).

Parameters	Rye data	Corn data	Wheat data	Unit
Quantity of grains	270	260	285	kg/hectolitre of pure alcohol
Electricity consumption	33	32	33	kWh/hectolitre of pure alcohol
Heat consumption	1,150	1,130	1,150	MJ/hectolitre of pure alcohol
Water consumption	330	340	330	litres/hectolitre of pure alcohol
Sulphuric acid consumption	2	1,9	2	kg/hectolitre of pure alcohol
Soda consumption	3	2,9	3	kg/hectolitre of pure alcohol
Ammonium sulphate consumption	0.8	0.8	0.8	kg/hectolitre of pure alcohol
Quantity of coproducts *Distiller's grains* (+percentage of dry substances)	95	82 (92% DS)	105 (92.8% DS)	kg/hectolitre of pure alcohol

8.1.2. Biological treatment of organic production waste

The biological treatment of waste from agri-food processing processes should be addressed in a cross-sector way in the cross-sector food products repository.

8.1.3. List of processes

The inventory data required for the electricity and heat production processes are reproduced hereinafter.

Electricity:

Electricity mix consumed for each country in the world (data available in the Impacts ® base).

Heat production:

Energy carrier	Availability in the IMPACTS® base
Natural gas	Available
Propane	Not available
Biogas	Not available
Light fuel oil	Available
Coal	Available
Wood	Available
Bagasse	Not available
Heat network	Not available

8.2. Analysis of the relevance of environmental indicators

Criteria	Climate change	Destruction of the ozone layer	Human toxicity, carcinogenic effects	Human toxicity, non-carcinogenic effects	Inorganic particle emissions	Ionizing radiation
Presence	**Compulsory**					
Assessment of an environmental issue from the products category and attributable to the product		Yes	Yes	Yes	Yes	Yes
Issue importance		Issue non-priority for the sector	Assessment of the issue is complicated as the method is highly uncertain (heavy metals)	Assessment of the issue is complicated as the method is highly uncertain (heavy metals)	Issue moderate for the sector	Issue non-priority for the sector as not very electricity-intensive. The high standardized value is linked to the fact that standardizing is European-specific and not French-specific.
Differentiation for a majority of market products (comparability)		Very limited	Yes	Yes	Yes	Not very differentiating
Overlapping with the other indicators		No	No	No	Correlated with the acidification indicator	No
Opportunity to highlight ecodesign solutions		No	Potentially	Potentially	Yes	No
Implementation, feasibility						
Possibility/ease of implementation for the database		Factors available	Factors available	Factors available	Factors available	Factors available
Accessibility to the primary data required for characterizing the indicator for the company		No direct emissions collected as primary data	No direct emissions collected as primary data	No direct emissions collected as primary data		Good, the main data to collect concerns electricity consumption and production location.
Consistency						
Consistency with the ADEME/AFNOR platform (general platform, Methodology WG, sectoral WGs) recommendations		Average, indicator for the General Principles for the Environmental Labelling of	Average, indicator for the General Principles for the Environmental Labelling of	Average, indicator for the General Principles for the Environmental Labelling of	Average, indicator for the General Principles for the Environmental Labelling of	Average, indicator for the General Principles for the Environmental Labelling of

		Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG
Life-cycle scope		-	-	-		
Product-packaging scope		-	-	-		
Consistency with other indicators indicated		-	-	-		
Robustness, reliability						
Scientific and international recognition		Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook
Methodological robustness		Classification I in the ILCD Handbook	Classification II/III in the ILCD Handbook	Classification II/III in the ILCD Handbook	Classification I in the ILCD Handbook	Classification II in the ILCD Handbook
Modelling reliability (calculation rule)		Not studied as the issue is non-priority				
Reliability expected from primary data		Not studied as the issue is non-priority	Good, takes into account the mass and type of primary packaging, transportation distances as well as agricultural raw materials (type and quantity).	Good, takes into account the mass and type of primary packaging, transportation distances as well as agricultural raw materials (type and quantity).		Good
Reliability of secondary data		Poor, as the impacts generally come from steps that are highly upstream and from processes that are relatively old.	Limited, as the indicator is highly sensitive to agricultural practices and to emissions of heavy metals in extremely small quantities	Limited, as the indicator is highly sensitive to agricultural practices and to emissions of heavy metals in extremely small quantities		Good
Conclusion	**→ Used**	**Issue non-**	**Method and**	**Method and**	**Issue moderate**	**Issue non-**

		priority for the sector → eliminated	**secondary data currently relatively unreliable → eliminated**	**secondary data currently relatively unreliable → eliminated**	**and indicator not recommended by the food product repository → eliminated**	**priority for the sector → eliminated**

Criteria	Photochemical pollution	Acidification	Terrestrial eutrophication	Aquatic eutrophication (freshwater)	Aquatic eutrophication (marine water)	Aquatic ecotoxicity (freshwater)
Presence						
Assessment of an environmental issue from the products category and attributable to the product	Yes	Yes	Yes	Yes	Yes	Yes
Issue importance	Important for matured spirit drinks, unimportant for the others.	Issue significant for the sector	Issue significant for the sector	Issue significant for the sector	Issue significant for the sector	Issue significant for the sector
Differentiation for a majority of market products (comparability)	Clear difference related to the maturing period and to the climate and geographical conditions of the maturing location	Yes	Yes	Yes	Yes	Yes
Overlapping with the other indicators	No	Partially correlated with marine and terrestrial eutrophication	Partially correlated with marine eutrophication and acidification	Partially correlated with marine eutrophication, related to agricultural practices.	Partially correlated with acidification, terrestrial eutrophication and aquatic eutrophication (freshwater).	No
Opportunity to highlight ecodesign solutions	No	Yes	Yes	Yes	Yes	No
Implementation, feasibility						
Possibility/ease of implementation for the database	Factors available	Factors available	Factors available	Factors available	Factors available	Factors available
Accessibility to the primary data required for characterizing the indicator for the company	Good, this refers essentially to ethanol evaporation during maturing and/or on the production site.	Good for energy consumption, for glass packaging masses and for the quantity and type of agricultural raw materials.	Good for energy consumption, for glass packaging masses and for the quantity and type of agricultural raw materials.	Good, this refers to the type of input and quantity.	Good, this refers to the type of input and quantity.	Good, the main data to collect concerns electricity consumption and production location.
Consistency						
Consistency with the ADEME/AFNOR platform (general platform, Methodology WG,	Average, indicator for the General Principles for the Environmental	Average, indicator for the General Principles for the	Average, indicator for the General Principles for the	Average, indicator for the General Principles for the	Very good, indicator for the General Principles	Very good, indicator for the General Principles

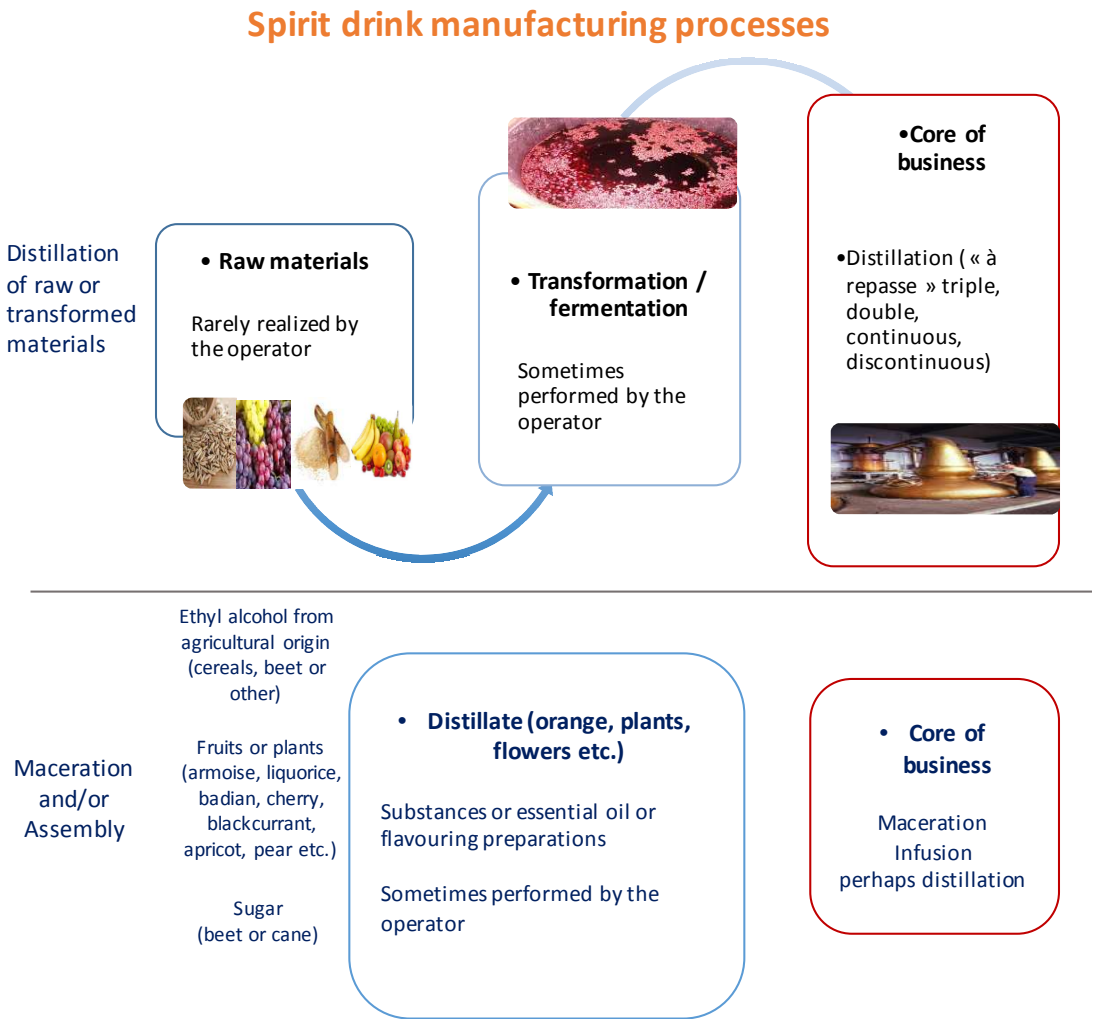
sectoral WGs) recommendations	Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG
Life-cycle scope	-	-	-			
Product-packaging scope	-	-	-			
Consistency with other indicators indicated	-	-	-			
Robustness, reliability						
Scientific and international recognition	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook
Methodological robustness	Classification II in the ILCD Handbook	Classification II in the ILCD Handbook	Classification II in the ILCD Handbook	Classification II in the ILCD Handbook	Classification II in the ILCD Handbook	Classification II/III in the ILCD Handbook
Modelling reliability (calculation rule)	Good, measure of alcohol rates at maturing input and output	Good				
Reliability expected from primary data	Good, measure of alcohol rates at maturing input and output	Good, quantity and type of agricultural raw materials, primary packaging and distillation energy consumption.	Good, quantity and type of agricultural raw materials, primary packaging and distillation energy consumption.	Good, quantity and type of agricultural raw materials.	Good, quantity and type of agricultural raw materials, primary packaging and distillation energy consumption.	Good, takes into account the mass and type of primary packaging, transportation distances as well as agricultural inputs (type and quantity).
Reliability of secondary data	Not-concerned, this refers to direct emission data	Good for combustion processes, more limited for agricultural raw materials.	Good for combustion processes, more limited for agricultural raw materials.	Limited for agricultural processes, as of a highly variable nature.	Good for combustion processes, more limited for agricultural raw materials.	Limited as the indicator is highly sensitive to agricultural practices and to the molecules

						used as pesticides.
Conclusion	**Important issue only for part of spirit drinks and indicator not recommended by the food product repository. →eliminated**	**Significant issue for the sector, but indicator not recommended by the food product repository and partly correlated with marine eutrophication→ eliminated**	**Significant issue for the sector, but indicator not recommended by the food product repository and strongly correlated with marine eutrophication→ eliminated**	**Significant issue for the sector, but indicator not recommended by the food product repository and partly correlated with marine eutrophication→ eliminated**	**Significant issue for the sector, and recommended by the food product repository. → used**	**Significant issue for the sector, and recommended by the food product repository, but secondary data and method contain a high level of uncertainty → proposed as optional without communicating**

Criteria	Depletion of non-renewable natural resources	Conversion of land	Depletion of water resources
Presence			
Assessment of an environmental issue from the products category and attributable to the product	Yes	Yes	Yes
Issue importance	Issue moderate for the sector	Issue extremely important for the sector	Issue significant for the sector
Differentiation for a majority of market products (comparability)	Clear difference related to maturing period	Yes	Yes
Overlapping with the other indicators	No	No	Partially correlated with marine eutrophication, related to agricultural practices.
Opportunity to highlight ecodesign solutions	No	Yes	Yes
Implementation, feasibility			
Possibility/ease of implementation for the database	Factors available	Factors available	Factors available
Accessibility to the primary data required for characterizing the indicator for the company	Good	Good, this refers to the consumption of agricultural raw materials and their origin.	Good, this refers to the type of raw materials and quantity.
Consistency			
Consistency with the ADEME/AFNOR platform (general platform, Methodology WG, sectoral WGs) recommendations	Average, indicator for the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Average, indicator for the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG	Average, indicator for the General Principles for the Environmental Labelling of Consumer Products – Part 0: General Principles and Methodological Framework not recommended by the Food Products WG
Life-cycle scope	-	-	
Product-packaging scope	-	-	
Consistency with other indicators indicated	-	-	
Robustness, reliability			
Scientific and international recognition	Included in the ILCD Handbook	Included in the ILCD Handbook	Included in the ILCD Handbook
Methodological robustness	Classification II in the ILCD Handbook	Classification III in the ILCD Handbook	Classification II in the ILCD Handbook
Modelling reliability (calculation rule)	Good		
Reliability expected from primary data	Good, quantity and type of primary packaging and agricultural raw	Good, quantity and type of agricultural raw materials.	Good

	materials.		
Reliability of secondary data	Very limited, as the impacts come from steps that are highly upstream, in particular equipment and facilities.	Limited for agricultural processes, as of a highly variable nature (yields) and considerable methodological discrepancies between the different databases.	Limited for agricultural processes, due to methodological uncertainty and shortfalls as regards geographical differentiation.
Conclusion	**Moderate issue for the sector, but indicator not recommended by the food product repository and a high level of uncertainty as regards secondary data.** **→ eliminated**	**Key issue, but considerable methodological limits and secondary data quality is uncertain.** **→ eliminated**	**Moderate issue for the sector, but recommended by the food product repository and of increasing importance for the public.** **→ used**

8.3. Spirit drink manufacturing processes



8.4. Regulatory technical definitions and requirements (110/2008)

1. Ethyl alcohol of agricultural origin

Ethyl alcohol of agricultural origin possesses the following properties:
a) Organoleptic characteristics: no detectable taste other than that of the raw material;
b) Minimum alcoholic strength by volume: 96.0% vol ;
c) Maximum level of residues:
i) Total acidity, expressed in grams of acetic acid per hectolitre of 100 % vol. alcohol: 1.5;
ii) Esters expressed in grams of ethyl acetate per hectolitre of 100% vol. alcohol: 1.3;
iii) Aldehydes expressed in grams of acetaldehyde per hectolitre of 100% vol. alcohol: 0.5;
iv) Higher alcohols expressed in grams of methyl2 propanol1 per hectolitre of 100% vol. alcohol: 0.5;
v) Methanol expressed in grams per hectolitre of 100% vol. alcohol: 30 ;
vi) Dry extract expressed in grams per hectolitre of 100% vol. alcohol: 1.5;
vii) Volatile bases containing nitrogen expressed in grams of nitrogen per hectolitre of 100% vol. alcohol: 0.1;
viii) Furfural: not detectable.

2. Distillate of agricultural origin

Distillate of agricultural origin means an alcoholic liquid which is obtained by the distillation, after alcoholic fermentation, of an agricultural product or products listed in Annex I to the Treaty which does not have the properties of ethyl alcohol or of a spirit drink but still retains the aroma and taste of the raw material(s) used.
Where reference is made to the raw material used, the distillate must be obtained exclusively from that raw material.

3. Sweetening

Sweetening means using one or more of the following products in the preparation of spirit drinks:
a) Semi-white sugar, white sugar, extra-white sugar, dextrose, fructose, glucose syrup, sugar solution, invert sugar solution, invert sugar syrup, as defined in Council Directive 2001/111/EC of
20 December 2001 relating to certain sugars intended for human consumption (1);
b) Rectified concentrated grape must, concentrated grape must, fresh grape must;
c) Burned sugar, which is the product obtained exclusively from the controlled heating of sucrose without bases, mineral acids or other chemical additives;
d) Honey as defined in Council Directive 2001/110/EC of 20 December 2001 relating to honey (2);
e) Carob syrup;
f) Any other natural carbohydrate substances having a similar effect to those products.

4. Mixing

Mixing means combining two or more different drinks to make a new drink.

5. Addition of alcohol

Addition of alcohol means the addition of ethyl alcohol of agricultural origin and/or distillates of agricultural origin to a spirit drink.

6. Addition of water

In the preparation of spirit drinks, the addition of water shall be authorised, provided that the quality of the water is in conformity with Council Directive 80/777/EEC of 15 July 1980 on the approximation of the laws of the Member States relating to the exploitation and marketing of natural mineral waters (3) and Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption (4), and that the water added does not change the nature of the product.
This water may be distilled, demineralised, permuted or softened.

7. Blending

Blending means combining two or more spirit drinks of the same category, distinguished only by minor differences in composition due to one or more of the following factors:
a) The method of preparation;
b) The stills employed;
c) The period of maturation or ageing;
d) The geographical area of production.

The spirit drink so produced shall be of the same category of spirit drink as the original spirit drinks before blending.

8. Maturation or ageing
Maturation or ageing means allowing certain reactions to develop naturally in appropriate containers, thereby giving the spirit drink in question organoleptic qualities previously absent.

9. Flavouring
Flavouring means using in the preparation of a spirit drink one or more of the flavourings defined in Article 1(2)(a) of Directive 88/388/EEC.

10. Colouring
Colouring means using in the preparation of a spirit drink one or more colorants, as defined in Directive 94/36/EC of the European Parliament and of the Council of 30 June 1994 on colours for use in foodstuffs (5).

11. Alcoholic strength by volume
Alcoholic strength by volume means the ratio of the volume of pure alcohol present in the product in question at 20℃, to the total volume of that product at the same temperature.

12. Packaging
Packaging means the protective wrappings, such as papers, envelopes of all kinds, cartons and cases, used in the transport and/or sale of one or more containers.

Acronyms and abbreviations

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie
COD	Chemical Oxygen Demand
EAAO	Ethyl Alcohol of Agricultural Origin
GHG	Greenhouse Gas
DS	Dry Substances
IFV	French Wine and Vine institute
LCA	Life Cycle Assessment
PCR	Product Category Rules
PEF	Product Environment Footprint
PEFCR	Product Environment Footprint Category Rules
UNGDA	National Union of Alcohol Distillers Groups
VOC	Volatile Organic Compounds
WG	Work Group
WWTP	Wastewater Treatment Plant

List of the people involved in the follow-up, drafting and/or making of this guide

3A CONSULTING
ACCENTURE HOLDING FRANCE SAS
ACDLEC - ASSO CTRES DISTRIBUTEURS E LECLERC
ACFOR CONSEIL
ACN - ALLIANCE CARTON NATURE
ACTALIA
ACV PLUS
ADEME
ADEPALE
ADISSEO FRANCE SAS
AFED
AFNOR
AGROSOLUTIONS
AIRELE
ALTADEV
ALTEREA
ALTERNATIVE CARBONE
ANDROS SNC
ANEEFEL
ANIA - ASSO NATIONALE IND AGRO ALIMENTAIRES
ANMF
ANNE MARIE JOANNES DESPAUX
ANTHONY BOULE
APCA - ASSO PERM CHAMBRES AGRICULTURE
APCMA
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CARBONE 4
CARTON ONDULE DE FRANCE
CASTEL FRERES SA
CCD - CENTRE DE LA CONSOMMATION DURABLE
CCI - CHAMBRE COMMERCE ET INDUSTRIE
CCI 77
CCI ALSACE
CELENE
CERVIA PARIS ILE DE FRANCE
CFSI
CGAD
CGDD
CH SYND FABRICANTS SACS PAPIER
CHAMBRE DE METIERS & DE L ARTISANAT
CHARAL
CHATEAU LAROSE TRINTAUDON
CIRAD - SCE COMPTABILITE
CIV CTRE INFORMATION VIANDES
CIVB - CONSEIL INTERPROF DES VINS BORDEAUX
CIVC - COMITE INTERPROF DU VIN DE CHAMPAGNE
CLARISSE FISCHER
CLM - CENTRE FOR AGRICULTURE AND ENVIRONMENT
CMI - CARREFOUR MARCHANDISES INTERNATIONALES
COCA COLA ENTREPRISE
CODDE - CONCEPTION DVPT DURABLE ENVT
COM'PUBLICS
CONSEIL NATIONAL DE L EMBALLAGE
COOP DE FRANCE
COOPERATIVE MU
COPACEL
CRENO IMPEX
CSIF - CHAMBRE SYND. IMPORT. FR. FRUITS LEGUMES
CSO CNRS

CTC
CTCPA AUCH
CTIFL
CTP - CENTRE TECHNIQUE DU PAPIER
CYCLECO
CYNAPSYS
DAMIEN DE JONG
DANONE SA
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DECATHLON SA - B TWIN
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EMC DISTRIBUTION
ERM FRANCE
EVEA - EVALUATION & ACCOMPAGNEMENT
EY SERVICES FRANCE
FACCO
FCBA
FCD - FEDE COMMERCE DISTRIBUTION
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FEDERATION FRANCAISE DES SPIRITUEUX

FEEDSIM AVENIR
FICT
FIZIANS ENVIRONNEMENT
FLECHARD SAS
FLORENT CHALOT
FNB - FEDERATION NATIONALE BOISSONS
FNCG - FED. NAT. INDUSTRIES CORPS GRAS
FNE - FRANCE NATURE ENVIRONNEMENT
FNMJ-FED NAT METIERS JARDINERIE
FOOD4GOOD
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HOLDING VERTE
HOP CUBE
I CARE ENVIRONNEMENT
IAD - INSTITUT AGRICULTURE DURABLE
IAE
IFIP - INSTITUT DU PORC
IFREMER
ILEC
INAO - INST NATIONAL ORIGINE QUALITE
INBP
INSAAE - AGROSUP
INSTITUT DES CORPS GRAS
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ABOUT ADEME

The French Environment and Energy Management Agency (ADEME) is active in the implementation of public policy in the areas of the environment, energy and sustainable development. The Agency provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work ADEME helps finance projects, from research to implementation, in the areas of waste management, soil conservation, energy efficiency and renewable energy, air quality and noise abatement.

ADEME is a public agency under the joint authority of the Ministry for Ecology, Sustainable Development and Energy, and the Ministry for Education, Higher Education and Research.

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