II

(Non-legislative acts)

DECISIONS

COMMISSION DECISION (EU) 2017/1508

of 28 August 2017

on the reference document on best environmental management practice, sector environmental performance indicators and benchmarks of excellence for the food and beverage manufacturing sector under Regulation (EC) No 1221/2009 of the European Parliament and of the Council on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC [1], and in particular Article 46(1) thereof,

Whereas:

(1) Sectoral reference documents developed by the Commission in accordance with Regulation (EC) No 1221/2009 are necessary to help organisations in a given sector better focus on the most important aspects of their environmental management and facilitate the evaluation, reporting and improvement of an organisations' environmental performance. They include best environmental management practice, environmental performance indicators and, where appropriate, benchmarks of excellence and rating systems that permit the identification of environmental performance levels in those sectors.

(2) The best environmental management practices presented in the Annex of this decision address key environmental issues identified for the food and beverage manufacturing sector. They should also foster a more circular economy by identifying concrete actions to improve waste management, to stimulate the use of by-products and to prevent food waste.

(3) Meeting the benchmarks of excellence identified in the sectoral reference document is not mandatory for EMAS-registered organisations since EMAS leaves the assessment of the feasibility of the benchmarks, in terms of costs and benefits, to the organisations themselves.

(4) Regulation (EC) No 1221/2009 requires EMAS registered organisation to take sectoral reference documents into account when developing their environmental management system and when assessing their environmental performance in the environmental statement prepared in accordance with Annex IV of Regulation (EC) No 1221/2009.

[1] OJ L 342, 22.12.2009, p. 1.

(5) The food and beverage manufacturing sector addressed in the Annex of this Decision was identified as a priority sector for the adoption of sectoral and cross-sectoral reference documents in the Communication from the Commission — Establishment of the working plan setting out an indicative list of sectors for the adoption of sectoral and cross-sectoral reference documents, under Regulation (EC) No 1221/2009 on the voluntary participation of organisations in a Community eco-management and audit scheme (EMAS) [1]

(6) The measures provided for in this Decision are in accordance with the opinion of the Committee established pursuant to Article 49 of Regulation (EC) No 1221/2009,

HAS ADOPTED THIS DECISION:

Article 1

The sectoral reference document on best environmental management practice, sector environmental performance indicators, and benchmarks of excellence for the food and beverage manufacturing sector is set out in the Annex.

Article 2

EMAS-registered organisations in the food and beverage manufacturing sector shall take the sectoral reference document referred to in Article 1 into account and shall therefore:

— use relevant elements of the sectoral reference document when developing and implementing their environmental management system in light of the Environmental Reviews,

— use the relevant sector-specific environmental performance indicators described in the sectoral reference document to report on performance related to the more specific environmental aspects identified by an organisation in its environmental statement,

— mention in their environmental statement how the relevant best environmental management practices and benchmarks of excellence have been taken into account to assess the environmental performance of the organisation and the factors related to that performance.

Article 3

This Decision shall enter into force on the ninetieth day following that of its publication in the *Official Journal of the European Union*.

Done at Brussels, 28 August 2017.

For the Commission
The President
Jean-Claude JUNCKER

[1] OJ C 358, 8.12.2011, p. 2.

ANNEX

TABLE OF CONTENTS

1. INTRODUCTION

This sectoral reference document (SRD) is based on a detailed scientific and policy report ([1]) ('Best Practice Report') developed by the Institute for Prospective Technological Studies (IPTS), one of the seven institutes of the European Commission's Joint Research Centre (JRC).

Relevant legal background

The Community eco-management and audit scheme (EMAS) was introduced in 1993, for voluntary participation by organisations, by Council Regulation (EEC) No 1836/93 ([2]). Subsequently, EMAS has undergone two major revisions:

— Regulation (EC) No 761/2001 of the European Parliament and of the Council ([3]),

— Regulation (EC) No 1221/2009.

An important new element of the latest revision, which came into force on 11 January 2010, is Article 46 on the development of SRDs. The SRDs have to include best environmental management practices (BEMPs), environmental performance indicators for the specific sectors and, where appropriate, benchmarks of excellence and rating systems identifying performance levels.

How to understand and use this document

The eco-management and audit scheme (EMAS) is a scheme for voluntary participation by organisations committed to continuous environmental improvement. Within this framework, this SRD provides sector-specific guidance to the food and beverage manufacturing sector and points out a number of options for improvement as well as best practices.

The document was written by the European Commission using input from stakeholders. A Technical Working Group, comprising experts and stakeholders of the sector, led by the JRC, discussed and ultimately agreed on the best environmental management practices, sector-specific environmental performance indicators and benchmarks of excellence described in this document; these benchmarks in particular were deemed to be representative of the levels of environmental performance that are achieved by the best performing organisations in the sector.

The SRD aims to help and support all organisations that intend to improve their environmental performance by providing ideas and inspiration as well as practical and technical guidance.

The SRD is primarily addressed to organisations that are already registered with EMAS; secondly to organisations that are considering registering with EMAS in the future; and thirdly to all organisations that wish to learn more about best environmental management practices in order to improve their environmental performance. Consequently, the objective of this document is to support all organisations in the food and beverage manufacturing sector to focus on relevant environmental aspects, both direct and indirect, and to find information on best environmental management practices, as well as appropriate sector-specific environmental performance indicators to measure their environmental performance, and benchmarks of excellence.

How SRDs should be taken into account by EMAS registered organisations

Pursuant to Regulation (EC) No 1221/2009, EMAS registered organisations are to take SRDs into account at two different levels:

When developing and implementing their environmental management system in light of the environmental reviews (Article 4(1)(b)):

([1]) The scientific and policy report is publicly available on the JRC-IPTS website at the following address: http://susproc.jrc.ec.europa.eu/activities/emas/documents/FoodBeverageBEMP.pdf The conclusions on best environmental management practices and their applicability as well as the identified specific environmental performance indicators and the benchmarks of excellence contained in this Sectoral Reference Document are based on the findings documented in the scientific and policy report. All the background information and technical details can be found there.

([2]) Council Regulation (EEC) No 1836/93 of 29 June 1993 allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme (OJ L 168, 10.7.1993, p. 1).

([3]) Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) (OJ L 114, 24.4.2001, p. 1).

Organisations should use relevant elements of the SRD when defining and reviewing their environmental targets and objectives in accordance with the relevant environmental aspects identified in the environmental review and policy, as well as when deciding on the actions to implement to improve their environmental performance.

When preparing the environmental statement (Article 4(1)(d) and Article 4(4)):

(a) Organisations should consider the relevant sector-specific environmental performance indicators in the SRD when choosing the indicators ([1]) to use for their reporting of environmental performance.

When choosing the set of indicators for reporting, they should take into account the indicators proposed in the corresponding SRD and their relevance with regards to the significant environmental aspects identified by the organisation in its environmental review. Indicators need only be taken into account where relevant to those environmental aspects that are judged as being most significant in the environmental review.

(b) When reporting on environmental performance and on the other factors regarding environmental performance the organisations should mention in the environmental statement how the relevant best environmental management practices and, if available, benchmarks of excellence, have been taken into account.

They should describe how relevant best environmental management practices and benchmarks of excellence (which provide an indication of the environmental performance level that is achieved by best performers) were used to identify measures and actions, and possibly to set priorities, to (further) improve their environmental performance. However, implementing best environmental management practices or meeting the identified benchmarks of excellence is not mandatory, because the voluntary character of EMAS leaves the assessment of the feasibility of the benchmarks and of the implementation of the best practices, in terms of costs and benefits, to the organisations themselves.

Similarly to environmental performance indicators, the relevance and applicability of the best environmental management practices and benchmarks of excellence should be assessed by the organisation according to the significant environmental aspects identified by the organisation in its environmental review, as well as technical and financial aspects.

Elements of SRDs (indicators, BEMPs or benchmarks of excellence) not considered relevant with regards to the significant environmental aspects identified by the organisation in its environmental review should not be reported or described in the environmental statement.

EMAS participation is an ongoing process. Every time an organisation plans to improve its environmental performance (and reviews its environmental performance) it shall consult the SRD on specific topics to find inspiration about which issues to tackle next in a step-wise approach.

EMAS environmental verifiers shall check if and how the SRD was taken into account by the organisation when preparing its environmental statement (Article 18(5)(d) of Regulation (EC) No 1221/2009).

When undertaking an audit, accredited environmental verifiers will need evidence from the organisation of how the relevant elements of the SRD have been selected in light of the environmental review and taken into account. They shall not check compliance with the described benchmarks of excellence, but they shall verify evidence on how the SRD was used as a guide to identify indicators and proper voluntary measures that the organisation can implement to improve its environmental performance.

Given the voluntary nature of EMAS and SRD, no disproportionate burdens should be put on the organisations to provide such evidence. In particular, verifiers shall not require an individual justification for each of the best practices, sector-specific environmental performance indicators and benchmarks of excellence which are mentioned in the SRD and not considered relevant by the organisation in the light of its environmental review. Nevertheless, they could suggest relevant additional elements for the organisation to take into account in the future as further evidence of its commitment to continuous performance improvement.

([1]) According to Annex IV (B.e.) of the EMAS Regulation, the environmental statement shall contain 'a summary of the data available on the performance of the organisation against its environmental objectives and targets with respect to its significant environmental impacts. Reporting shall be on the core indicators and on *other relevant existing environmental performance indicators* as set out in Section C'. Annex IV — Section C states that 'each organisation shall also report annually on its performance relating to the more specific environmental aspects as identified in its environmental statement and, where available, take account of sectoral reference documents as referred to in Article 46.'

Structure of the sectoral reference document

This document consists of four sections. Section 1 introduces EMAS' legal background and describes how to use this document, while Section 2 defines the scope of this SRD. Section 3 briefly describes the different best environmental management practices (BEMPs) ([1]) together with information on their applicability, in general as well as at SME level. When specific environmental performance indicators and benchmarks of excellence could be formulated for a particular BEMP, these are also given. Some of the indicators and benchmarks are relevant for more than one BEMP and are thus repeated whenever appropriate. Finally, Section 4 presents a comprehensive table with a selection of the most relevant environmental performance indicators, associated explanations and related benchmarks of excellence.

2. SCOPE

This SRD addresses the environmental performance of the activities of the food and beverage manufacturing sector. In this document, the food and beverage manufacturing sector includes companies belonging to the following NACE code divisions (according to the statistical classification of economic activities established by Regulation (EC) No 1893/2006 of the European Parliament and of the Council ([2])):

— NACE code 10: manufacture of food products,

— NACE code 11: manufacture of beverages.

Best practices presented for the overall food and beverage manufacturing sector (Section 3.1) are addressed to all companies belonging to NACE codes 10 and 11.

The following two tables present the most significant direct and indirect environmental aspects ([3]) for food and beverage manufacturers, the related main environmental pressures and how these are tackled in this document. They are addressed either by BEMPs described in Section 3.1 or by making reference to other available reference documents such as the Best Available Techniques (BAT) Reference Document for the Food, Drink and Milk Industries (FDM BREF) ([4]).

Table 2.1

The most significant direct environmental aspects for food and beverage manufacturers and how these are addressed in the SRD

Most significant direct environmental aspects	Related main environmental pressures	BEMPs
Industrial processes and related operations	Emissions to water	— Reference to BAT in FDM BREF
	Emissions to air (NO_x, SO_x, VOCs, particulate matter)	— Reference to BAT in FDM BREF
	Solid waste generation	— Reference to BAT in FDM BREF — BEMP on avoiding food waste in food and beverage manufacturing (Section 3.1.9)

([1]) A detailed description of each of the best practices, with practical guidance on how to implement them, is available in the 'Best Practice Report' published by the JRC and available on-line at http://susproc.jrc.ec.europa.eu/activities/emas/documents/FoodBeverageBEMP.pdf Organisations are invited to consult it if interested in learning more about some of the best practices described in this SRD.

([2]) Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains (OJ L 393, 30.12.2006, p. 1).

([3]) According to Regulation (EC) No 1221/2009 'direct environmental aspect' refers to an environmental aspect associated with activities, products and services of the organisation itself, over which it has direct management control. Instead 'indirect environmental aspect' refers to an environmental aspect which results from the interaction of the organisation with third parties and which can to a reasonable degree be influenced by the organisation.

([4]) For more information on the content of the Best Available Techniques Reference Documents and full explanation of terms and acronyms, refer to the European Integrated Pollution Prevention and Control Bureau website: http://eippcb.jrc.ec.europa.eu/

Most significant direct environmental aspects	Related main environmental pressures	BEMPs
	Water consumption	— Reference to BAT in FDM BREF
	Energy consumption, GHG emissions (CO_2)	— BEMP on deploying energy management and energy efficiency throughout all operations (Section 3.1.7) — BEMP on integrating renewable energy in manufacturing processes (Section 3.1.8)
Refrigeration	Energy consumption, GHG emissions (refrigerants)	— BEMP on improving freezing and refrigeration (Section 3.1.6)
Cleaning operations	Water consumption, use of chemicals, waste water generation	— Reference to BAT in FDM BREF — BEMP on environmentally friendly cleaning operations (Section 3.1.4)
Transport and logistics	Energy consumption, GHG emissions, emissions to air (CO_2, CO, SO_2, NO_x, particulate matter etc.)	— BEMP on transport and logistics (Section 3.1.5)
Packaging	GHG emissions, energy consumption, resource depletion (material use)	— Reference to BAT in FDM BREF — BEMP on improving or selecting packaging to minimise environmental impact (Section 3.1.3)

Table 2.2

The most significant indirect environmental aspects for all food and beverage manufacturers and how these are addressed in the SRD

Most significant indirect environmental aspects	Related main environmental pressures	BEMPs
Supply chain management	GHG emissions, energy consumption, water consumption, emissions to air etc.	— BEMP on sustainable supply chain management (Section 3.1.2)
Agriculture	GHG emissions (CO_2, CH_4), biodiversity loss, emissions to air, eutrophication, water consumption	— BEMP on sustainable supply chain management (Section 3.1.2) — Reference to the Agriculture — crop and animal production SRD [1]

Most significant indirect environmental aspects	Related main environmental pressures	BEMPs
Packaging	GHG emissions, energy consumption, resource depletion (material use)	— BEMP on improving or selecting packaging to minimise environmental impact (Section 3.1.3)
Transport and logistics	Energy consumption, GHG emissions, emissions to air (CO_2, CO, SO_2, NO_x, particulate matter etc.)	— BEMP on transport and logistics (Section 3.1.5)
Retail	Energy consumption, food waste generation	— Reference to Retail Trade SRD ([2])
Food preparation by consumers	Energy consumption, food waste generation	— BEMP on improving or selecting packaging to minimise environmental impact (Section 3.1.3)

([1]) The Sectoral Reference Document for the agriculture — crop and animal production sector and the related 'Best Practice Report' published by the JRC are available online at: http://susproc.jrc.ec.europa.eu/activities/emas/agri.html
([2]) The Sectoral Reference Document for the retail trade sector and the related 'Best Practice Report' published by the JRC are available online at: http://susproc.jrc.ec.europa.eu/activities/emas/retail.html

Environmental aspects listed in Tables 2.1 and 2.2 were selected as the most significant for the majority of food and beverage manufacturers. However, the environmental aspects to be managed by specific companies, and whether each aspect is direct or indirect for a specific company, should be assessed on a case-by-case basis. Environmental aspects, such as hazardous waste, biodiversity or material use for areas other than those listed above could also be significant.

In addition to the BEMPs listed in Tables 2.1 and 2.2, an overarching BEMP on 'performing an environmental sustainability assessment of products and/or operations' can help to improve the environmental performance for all environmental aspects and related pressures presented in the tables.

Moreover, this SRD, apart from describing the best practices for the overall food and beverage manufacturing sector (all companies belonging to NACE codes 10 and 11) listed above, also includes a range of specific best practices for several subsectors, namely:

— processing of coffee (NACE code 10.83) in Section 3.2,

— manufacture of olive oil (NACE code 10.41) in Section 3.3,

— manufacture of soft drinks (NACE code 11.07) in Section 3.4,

— manufacture of beer (NACE code 11.05) in Section 3.5,

— production of meat and poultry meat products (NACE code 10.13) in Section 3.6,

— manufacture of fruit juice (NACE code 10.32) in Section 3.7,

— cheese-making operations (NACE code 10.51) in Section 3.8,

— manufacture of bread, biscuits and cakes (NACE codes 10.71 and 10.72) in Section 3.9,

— manufacture of wine (NACE 11.02) in Section 3.10.

3. BEST ENVIRONMENTAL MANAGEMENT PRACTICES, ENVIRONMENTAL PERFORMANCE INDICATORS AND BENCHMARKS OF EXCELLENCE FOR THE FOOD AND BEVERAGE MANUFACTURING SECTOR

3.1. Best environmental management practices for the whole food and beverage manufacturing sector

This section targets all food and beverage manufacturers (NACE codes 10 and 11).

3.1.1. *Performing an environmental sustainability assessment of products and/or operations*

BEMP is to assess the environmental impact of products and operations using life-cycle assessment (LCA) tools ([1]) to identify priority areas for action, or 'hotspots', and define a strategy for reducing the environmental impacts.

Applicability

When undertaking an environmental sustainability assessment, food and beverage manufacturers can face a number of challenges which include the complexity of the product and the accessibility of information; it can be expensive and time-consuming to undertake LCAs, and certain environmental impacts may also be beyond the control of the manufacturer and thus very difficult to act upon, even if they can be quantified.

This BEMP is applicable to SMEs in the food and beverage manufacturing sector, given that they can use simplified tools when their capabilities or resources do not permit full LCAs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i1) Percentage of sites or products ([1]) assessed using a recognised environmental sustainability assessment protocol (%). (i2) Number of sites or products assessed using a recognised environmental sustainability assessment protocol.	(b1) A company-wide environmental sustainability assessment covering all operations is implemented. (b2) An environmental sustainability assessment for all new products under development is carried out.

([1]) The percentage of products can be calculated (here and in following similar indicators) by considering the total different types of products manufactured and how many types of products are assessed using a recognised environmental sustainability assessment protocol or by weighting with sales volume each type of product manufactured for example.

3.1.2. *Sustainable supply chain management*

BEMP is to manage the supply chain, in particular ingredients or raw materials, by choosing one or more of the following three approaches:

— green procurement, i.e. selecting suppliers that fulfil identified environmental performance criteria ([2]),

— adapting recipes to remove unsustainable ingredients,

— supporting existing suppliers in improving their environmental performance.

([1]) With the aim of establishing a common method for measuring life cycle environmental performance, the European Commission developed the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) methods. The use of these methods was object of a Commission Recommendation in 2013 (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013H0179). The development of product- and sector-specific rules is being tested (between 2013 and 2016) by more than 280 volunteering companies and organisations grouped in 26 pilot cases (see list on http://ec.europa.eu/environment/eussd/smgp/ef_pilots.htm).

([2]) The environmental performance criteria used in green procurement may be based on certifications, standards, ecolabels, private initiatives/cooperation or the results of sustainability assessments (see BEMP 3.1.1) developed internally or externally.

Additionally, for those food and beverage manufacturers using substantial amounts of water as an ingredient (e.g. beverage manufacturers), it is BEMP to firstly assess the risks posed, by the production site, to the local water resources. Afterwards, a water resource sustainability programme can be put in place, detailing specific actions that can be taken to support the preservation of the local water resources.

Applicability

Sustainable supply chain management can have some limitations: (i) the green procurement approach assumes that 'green' choices are available; (ii) recipes can be adapted if unsustainable ingredients can be removed with equivalent, more sustainable alternatives; and (iii) it may not always be possible to influence the performance of existing suppliers, e.g. due to small volumes of products purchased by an SME. However, the three approaches presented are in most cases broadly applicable.

This BEMP, with the aforementioned limitations, is fully applicable to SMEs in the food and beverage manufacturing sector.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i3) Percentage of ingredients or products (e.g. packaging) meeting the company's specific sustainability criteria or complying with existing sustainability standards (% by number or value in EUR)	—
(i4) Percentage of ingredients or products (e.g. packaging) sourced via green procurement (% by number or value in EUR)	
(i5) Percentage of suppliers engaged in sustainability improvement programmes (% by number of suppliers or value in EUR of products they supply)	
(i6) Percentage of suppliers with environmental management systems in place (% by number of suppliers or value in EUR of products they supply)	

3.1.3. *Improving or selecting packaging to minimise the environmental impact*

BEMP is to minimise the environmental impact of packaging (i.e. primary, secondary and tertiary packaging), throughout the product life cycle, for example by the use of:

— eco-design tools to simulate the environmental performance of the packaging during the design,

— 'lightweighting', i.e. packaging with reduced weight but the same protective performance,

— bulk packaging of ingredients delivered by suppliers to the company,

— refills, e.g. refillable packaging to be returned to the food and beverage manufacturer,

— returnable secondary and tertiary packaging,

— packaging containing recycled material,

— packaging containing bio plastics provided that the environmental benefits of this choice can be proven.

Furthermore, BEMP is for food and beverage manufacturers to help consumers reducing the food waste they generate, by:

— using modified atmosphere packaging to increase shelf-life of products,

— identifying the optimum portion size of the packaging with a view to better cater for different lifestyles and households to reduce leftovers,

— including messages on packaging recommending optimised storage of the food product to avoid its spoilage.

Applicability

This BEMP is applicable to all food and beverage manufacturers including SMEs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i7) Packaging-related CO_2 emissions per weight/volume unit of product manufactured (packaging g CO_{2eq}/g or ml of product)	(b3) An eco-design tool is employed when designing packaging to identify options with a low environmental impact.
(i8) Weight of packaging per weight/volume unit of product manufactured (g of packaging/g or ml of product)	
(i9) Percentage of packaging which is recyclable (%)	
(i10) Percentage of recycled material content in packaging (%)	
(i11) Average density of net product category per volume of packaged product (kg of product/l of packaged product)	

3.1.4. *Environmentally friendly cleaning operations*

BEMP is to reduce the amount of water, energy and chemicals used during cleaning operations by:

— implementing and optimising 'Cleaning In Place' (CIP) systems by optimal cleaning preparation (e.g. ice pigging), accurate design and configuration, measuring and controlling detergent temperature and concentration, using mechanical action appropriately, reusing final rinse water for the pre-rinse, recycling detergents, and by using real-time cleaning verification,

— optimising manual cleaning operations by raising awareness, monitoring the energy, water and chemicals used, dry clean-up and cleaning of equipment as soon as possible after use,

— minimising or avoiding the use of harmful chemicals by capturing and reusing cleaning agents and using less harmful and biological chemicals,

— better production planning in order to avoid changes in the production process that require the equipment to be cleaned,

— better plant design by improving the design of vessels, pipework, etc. so as to eliminate areas that detergent cannot reach or where fluid accumulates.

Applicability

This BEMP is applicable to all food and beverage manufacturers including SMEs. However, some limitations may arise when substantial economic investment is needed in order to adopt more sophisticated cleaning systems.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i12) Cleaning-related energy use per unit of production (kWh/weight, volume or number of products)	—
(i13) Cleaning-related water use per unit of production (m^3/weight, volume or number of products)	
(i14) Cleaning-related water use (m^3) per day	
(i15) Cleaning-related waste water generation per unit of production (m^3/weight, volume or number of products)	
(i16) Cleaning-related waste water generation (m^3) per clean	
(i17) Mass (kg) or volume (m^3) of cleaning product used per unit of production (weight, volume or number of products)	
(i18) Share of cleaning agents (%) with an ISO Type I ecolabel ([1]) (e.g. EU Ecolabel)	

([1]) As part of the ISO 14000 series of environmental standards, the International Standards Organisation (ISO) has drawn up a subseries (ISO 14020) specific to environmental labelling, which covers three types of labelling schemes. In this context a 'Type I' ecolabel is a multi-criteria label developed by a third party. Examples are, at EU level, the 'EU Ecolabel' or, at national or multilateral level, the 'Blaue Engel', the 'Austrian Ecolabel' and the 'Nordic Swan'.

3.1.5. *Improving transport and distribution operations*

BEMP is to improve the environmental impact of the transport and logistics operations, from a more strategic/general level down to operational considerations, by:

— green procurement and environmental requirements for transport providers,

— efficiency monitoring and reporting for all transport and logistic operations,

— integration of transport efficiency into sourcing decisions and packaging design,

— shift towards more efficient transport modes (e.g. rail, maritime),

— optimisation of warehousing (i.e. thermal insulation, location, management),

— route optimisation (for road transport): optimisation of route network, route planning, use of telematics and driver training,

— minimisation of the environmental impact of road vehicles through purchasing decisions and retrofit modifications (e.g. purchase of electric vehicles for local deliveries or conversion of engines to natural gas and biogas in larger trucks).

Applicability

This BEMP is applicable to all food and beverage manufacturers, including SMEs. However, some of the specific measures listed above may not be relevant if the company does not manage or have any influence on the related specific activities in the field of transport and logistics.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i19) Specific transport GHG emissions per product quantity. kg CO_{2eq} emitted during transport per: tonne, m^3, pallet, or case (according to relevance) or kg CO_{2eq} per net amount (tonne, m^3) of product delivered	(b4) For 100 % of transport and logistics operations (including third-party providers), the following indicators are reported: % of transport by different modes; kg CO_{2eq} per m^3/pallet etc. delivered.
(i20) Specific transport GHG emissions per product quantity and distance. CO_{2eq} emitted during transport per tonne of product and kilometre transported (kg CO_{2eq}/tonne/km)	(b5) For in-house transport and logistics operations, the following indicators are reported: load factor for freight transport (% weight or volume capacity); kg CO_{2eq} per t·km.
(i21) Vehicle fuel consumption for road transport (l/100 km)	(b6) Insulation of temperature-controlled warehouses is optimised.
(i22) Total energy use of warehouses (kWh/m^2) over a specific timespan (e.g. annual) normalised by relevant unit of throughput (e.g. kg net product)	(b7) Heavy goods vehicles' average fuel consumption is less than or equal to 30 l/100 km.
(i23) Percentage of transport by different modes (%)	
(i24) Load factor for freight transport (e.g. truck load factor) (% weight or volume capacity)	
(i25) Percentage of empty runs for road vehicles (%)	
(i26) Percentage of deliveries carried out via backhauling (%)	

3.1.6. *Improving freezing and refrigeration*

BEMP is to improve the existing refrigeration and freezing equipment and procedures by:

— appropriate temperature selection based on the needs of the products that are refrigerated or frozen,

— precooling of hot/warm products before placing them into the cooling equipment,

— minimising the volume of products or ingredients kept in cold storage,

— avoiding temperature leakage e.g. via door seals, thanks to the use of high-speed doors and of air curtains, and to information and training of the staff,

— systematically collect data on cooling loads, energy use and leakage rates and have in place a regular inspection and maintenance plan for the cooling equipment.

When freezing and refrigeration equipment is upgraded or new facilities are designed and built, it is BEMP to:

— switch from hydrofluorocarbons (HFCs) to refrigerants with lower global warming potential (e.g. natural refrigerants),

— agree a multi-year 'leak-free warranty' with the equipment supplier,

— recover and reuse waste heat generated from the refrigeration unit or from other processes generating waste heat (e.g. production processes),

— choose equipment, control systems and a plant layout (i.e. location and arrangement of the areas at different temperatures) that allow minimum energy consumption and avoid temperature losses and refrigerant leaks.

Applicability

This BEMP is applicable to all food and beverage manufacturers, including SMEs. Some limitations to the implementation of each of the measures listed above may arise from specific process or product requirements.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i27) Percentage use of refrigeration systems running on natural refrigerants compared to the total number of refrigeration systems (%)	(b8) Use 100 % refrigeration systems running on natural refrigerants in all sites.
(i28) Coefficient of performance (COP) per single refrigeration system or for the entire facility	
(i29) Coefficient of system performance (COSP) per single refrigeration system or for the entire facility	
(i30) Energy efficiency ratio (EER) per single refrigeration system or for the entire facility	
(i31) Energy used for refrigeration per product unit per cooled area (kWh/m^2/weight, volume or number of products)	

3.1.7. *Deploying energy management and improving energy efficiency throughout all operations*

BEMP is to manage energy use throughout all operations of the company by:

— putting in place a comprehensive energy management system (EnMS) such as ISO 50001 ([1]), as part of an environmental management system such as EMAS,

— installing meters (or smart meters) at the individual process level, ensuring accurate energy monitoring,

— carrying out regular energy auditing and monitoring to identify the main drivers of energy use (at the process level),

— implementing appropriate energy efficiency solutions for all processes in a facility, in particular taking into account potential synergies in heat, cold and steam demand,

— investigating and, if possible, exploiting synergies for the production and use of electricity, heat, cold and steam with neighbouring facilities (i.e. industrial symbiosis).

Applicability

This BEMP is applicable to all food and beverage manufacturers, including SMEs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i32) Overall energy use per product unit (kWh/weight, volume, value or number of products)	(b9) A comprehensive energy management system (EnMS) is in place (e.g. ISO 50001 ([1])).
(i33) Overall energy use per facility surface area (kWh/m^2)	(b10) Regular energy auditing and monitoring are deployed to identify the main drivers of energy use.
(i34) Overall energy use (kWh) for specific processes	(b11) Appropriate energy efficiency solutions are implemented for all processes in a facility.
(i35) Net energy use (i.e. overall energy use minus recovered and renewable energy) per product unit (kWh/weight, volume, value or number of products)	(b12) Synergies in heat/cold/steam demand are exploited across processes, within the facility and neighbouring ones.

([1]) More information on the standard ISO 50001 — Energy management is available at: http://www.iso.org/iso/home/standards/management-standards/iso50001.htm

Environmental performance indicators	Benchmarks of excellence
(i36) Deployment of heat exchangers to recover hot/cold streams (y/n) (i37) Insulation of all steam pipes (y/n)	

([1]) A comprehensive energy management system can also be part of a more comprehensive environmental management system like EMAS

3.1.8. *Integrating renewable energy in the manufacturing processes*

BEMP is to integrate the use of renewable energy into the production of food and beverages. Specifically, BEMP is to go beyond the use of renewable electricity and to meet the heat demand of production processes (after implementing measures to improve energy efficiency and to reuse waste heat, as mentioned in Section 3.1.7) with renewable heat (i.e. from solar heating systems, biomass or biogas) instead of non-renewable heat. The choice of the source of renewable heat depends on the local conditions, e.g. whether locally produced biomass and suitable feedstock for biogas production are available and/or if annual solar radiation is considerable.

Applicability

The principle of this BEMP is applicable to all food and beverage manufacturers, including SMEs. However, renewable heat systems rely on the availability of a suitable local renewable energy source and the heat and temperature requirements of the production processes. Additionally, retrofitting an already existing production facility with renewable heat requires a detailed technical feasibility analysis taking into account the current layout and the constraints of the current production processes.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i38) Percentage of the energy use of production facilities (heat and electricity separately) met by renewable energy sources (%) (i39) Percentage of the energy use of production facilities (heat and electricity separately) met by on-site or nearby renewable energy sources (%)	(b13) On-site or nearby renewable heat energy generation for suitable manufacturing processes is implemented. (b14) Process technologies are adapted to better match the supply of heat from renewables.

3.1.9. *Avoiding food waste in manufacturing operations*

BEMP is to reduce food waste generation at the production facility by identifying all avoidable waste with approaches such as:

— total productive maintenance: engaging staff at all levels and functions to maximise the overall effectiveness of production equipment,

— Kaizen: focusing on continuous improvement in reducing food waste identifying and realising the savings that are easy to achieve (i.e. easy wins, 'low-hanging fruit'),

— value stream mapping: improving visibility of value-adding and non-value-adding processes in order to highlight sources of waste.

Using these approaches, food waste can be reduced by implementing the following:

— awareness-raising/staff engagement campaigns,

— review of product ranges and consequently reduction of inventory losses,

— production-ready packaging in order to reduce raw ingredient losses,

— just-in-time procurement and delivery of raw material,

— increased visibility of wastage quantities generated through waste audits,

— optimise production yields,

— move from the traditional supplier 'push' approach to a customer 'pull' system to ensure that production reflects the demand,

— encourage tidier housekeeping and standards of cleanliness.

Moreover, it is BEMP to publicly report on food waste generation and the waste prevention activities in place and planned for the future, as well as to identify targets in this field and plan appropriate activities to achieve them.

Applicability

This BEMP is applicable to all food and beverage manufacturers, including SMEs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i40) Overall equipment effectiveness (OEE) ([1]) (%)	—
(i41) Ratio between the amount of food waste generated (sent for recycling, recovery and disposal, including food waste used as a source of energy or fertilisers) and the quantity of finished products (tonnes of food waste/tonne of finished products)	

([1]) Overall equipment effectiveness (OEE) is calculated by multiplying three elements: (i) availability (percentage of planned time the equipment is operating); (ii) performance (actual throughput versus target throughput, as a percentage); and (iii) product quality rate (percentage of overall products that are not defects or defective).

3.1.10. *Taking into account the Reference Document on Best Available Techniques in the Food, Drink and Milk Industries (FDM BREF)*

It is BEMP for all food and beverage manufacturers (NACE codes 10 and 11) to implement the relevant Best Available Techniques (BAT) or other techniques that can achieve equivalent or higher level of environmental performance, and consider the relevant emerging techniques presented in the 'Reference Document on Best Available Techniques in the Food, Drink and Milk Industries (FDM BREF)' ([1]).

It is BEMP to aim for the most demanding end of the Best Available Techniques-Associated Emission (or Environmental Performance) Levels (BAT-AE(P)Ls).

Applicability

This BEMP is applicable to all food and beverage manufacturers, including SMEs, provided that the Best Available Techniques and emerging techniques are relevant for the activities and processes of the company. Although the BAT and the related BAT-AE(P)Ls described in the FDM BREF were identified for large industrial installations, they are broadly relevant and often applicable also to smaller industrial production sites. However, the applicability and relevance of any specific technique for a specific company should be assessed on a case-by-case basis. For instance, most techniques would not be applicable to companies producing on a very small scale in a non-industrial facility.

([1]) For more information on the content of the Best Available Techniques Reference Documents and a full explanation of terms and acronyms, refer to the European Integrated Pollution Prevention and Control Bureau website: http://eippcb.jrc.ec.europa.eu/

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i42) Relevant Best Available Techniques identified in the FDM BREF or other techniques that can achieve equivalent or higher level of environmental performance are implemented (y/n). (i43) Relevant emerging techniques identified in the FDM BREF are considered (y/n)	(b15) A level of environmental performance which is within the best 10 % ([1]) of each of the BAT-AE(P)L ranges defined in the FDM BREF is achieved.

([1]) The best 10 % can correspond to the highest or lowest 10 % of each of the BAT-AE(P)L ranges, depending on which is the most environmentally demanding.

3.2. **Best environmental management practices in the processing of coffee**

This section targets companies processing coffee (NACE code 10.83).

3.2.1. *Reduction of energy use through the adoption of green coffee preheating in batch coffee roasting*

BEMP is to preheat the coffee beans immediately before the roasting operation by means of recirculating the exhaust gases from the roasting of the previous batch. This energy-saving technique can be combined with other energy-saving techniques, such as the partial reuse of the roasting gases in the same roasting system either directly (roasters with recirculation) or by means of a heat exchanger, or to use the roasting gases to produce warm water or for space heating.

Applicability

This BEMP is applicable when planning the installation of any new batch coffee roaster but may require considerable space and/or reinforcement of the building structure. It is also possible to retrofit an existing roaster with a preheater; however, it is more complex than the installation of a coffee preheater in a new coffee roaster because of costs, space requirements, building works, etc. The applicability of this BEMP for SMEs may be limited because of the substantial economic investment needed.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i44) Reduction of heat energy use in coffee roasting due to the introduction of green coffee preheating (%). (i45) Heat energy use in roasting operations (kWh/tonne of green coffee). (i46) Specific CO_2 emission (kg CO_{2eq}/tonne roasted coffee) calculated taking into account electricity and fuel consumption (e.g. propane, methane) in roasting operations.	(b16) A green coffee preheating system is in place.

3.3. **Best environmental management practices in the manufacture of olive oil**

This section targets companies manufacturing olive oil (NACE code 10.41).

3.3.1. *Minimising water consumption in olive oil separation*

During the separation (also known as clarification or polishing) of the olive oil from the remaining fine particles and water, BEMP is to use a vertical centrifuge that minimises the use of water. The quantity of water used should be kept to the minimum amount required to achieve the desired final olive oil composition.

Applicability

This BEMP is applicable to all olive oil manufacturers, including SMEs. The amount of water needed in the separation phase is highly dependent on the quality of the oil coming from the decanter.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i47) Water use in olive oil separation (l) per weight (tonnes) of olives processed or per unit volume (l) of olive oil manufactured	(b17) Water used in olive oil separation is less than 50 l (5 %) per 1 000 l of olive oil manufactured

3.3.2. *Reduced washing of olives upon reception*

BEMP is to reduce the need for olives to be washed before being processed into olive oil. For instance, this can be achieved by harvesting the olives from the trees. To this aim, olive oil manufacturers can establish an appropriate cooperation with the farmers providing the olives.

The adoption of appropriate measures to recycle the water still needed to wash olives can deliver further water savings.

Applicability

This BEMP is applicable to a broad range of olive oil mills:

— small oil mills (which process olives grown on their own olive trees): these companies control the whole olive oil production process (from the production of olives through to sale to the customer) and therefore can implement directly the measures to deliver clean olives to the mill,

— industrial olive oil producers (which process olives supplied through an appropriate contract with farmers): different prices can be offered for the olives delivered, depending (among other parameters) on the level of dirtiness of the olives,

— cooperatives (which process the olives of their members): these organisations establish agreements among their members and a low degree of olive dirtiness or certain harvesting practices can be included among the agreed parameters.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i48) Ratio between the quantity of water used to wash the olives upon reception and the quantity of olives processed (l of water per tonne of olives)	(b18) For olives delivered clean, no water (0 l) is used to wash the olives upon reception

3.4. **Best environmental management practices in the manufacture of soft drinks**

This section targets companies manufacturing soft drinks (NACE code 11.07).

3.4.1. *Use of blowers in the drying stage of bottles/packaging*

BEMP is to install well-designed high-velocity small blowers at the point of use (in can/bottle-drying stages and in air-ionising rinsing systems) which can replace compressed air-based dryers.

Applicability

This BEMP is applicable to manufacturers of soft drinks that air rinse or dry cans or bottles before filling them. This BEMP is applicable to SMEs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i49) Energy use for blowing/drying per litre of product (kWh/l)	—

3.5. **Best environmental management practices in the manufacture of beer**

This section targets companies manufacturing beer (NACE code 11.05).

3.5.1. *Reducing energy use in wort boiling*

Beer manufacturers can reduce the energy use during wort boiling by:

— implementing wort preheating with heat recovered from the wort vapour condensing thanks to the use of an energy storage system,

— reducing evaporation rates during boiling (e.g. by two-phase boiling systems, dynamic low-pressure boiling) provided that the beer taste allows adopting this solution.

Applicability

This BEMP is broadly applicable to all manufacturers of beer, including SMEs.

The adoption of wort preheating is applicable to new breweries, provided that there are no space restrictions for installing the equipment needed. In the case of existing plants an economic study should be carried out in order to assess the opportunity to change the wort boiling installation.

The reduction of evaporation rates is not suitable for all types of beer since it influences the beer's organoleptic characteristics. When implemented, it needs to be considered within the overall brewing process and applied to the extent that is suitable to the specific product.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i50) Evaporation rate (%) during wort boiling (i51) Overall energy use in the production process per hectolitre of beer produced (MJ/hl) (i52) Energy use in wort preheating per hectolitre of beer produced (MJ/hl) (i53) Number of brews between two cleans of the kettle	(b19) A wort preheating system with recovered heat from wort vapour condensing is installed. (b20) Evaporation rate during wort boiling is less than 4 %

3.5.2. *Moving from batch to continuous fermentation systems*

BEMP is to move from batch to continuous fermentation systems to save energy and water. One option is the use of a four-tank continuous system consisting of three stirred tanks and a fourth unstirred one, where the beer is separated from the yeast. From the last tank, the clarified beer flows to a warm maturation tank where the flavour is refined by yeast action.

Applicability

There are some limitations to the applicability of this BEMP. The technique is mostly feasible for large-scale brewing operations. Moreover, switching to continuous brewing can have effects on the organoleptic characteristics of the final product and may not be suitable for all beer types.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i51) Overall energy use in the production process per hectolitre of beer produced (MJ/hl) (i54) Water consumption in the production process per hectolitre of beer produced (hl of water/hl of beer)	—

3.5.3. *CO_2 recovery in beer production*

BEMP is to recover the CO_2 generated during beer production from the tops of the fermentation tanks/vessels, the maturation vessels and the bright beer tanks. CO_2 can then be scrubbed, purified and compressed for storage. It can later be used in-house in a number of brewery operations, e.g. carbonation and bottling, as well as sold or provided for other applications, in the framework of industrial symbiosis.

Applicability

This BEMP can be adapted to all scales of beer production. However, microbreweries and small breweries ([1]) might find it unattractive because of investments costs and the complexity of the system to recover the CO_2 generated.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i55) Percentage of CO_2 recovered from fermentation (%) (i56) Amount of CO_2 recovered per hectolitre of beer produced (g CO_2/hl) (i57) Hourly capacity of the brewery's CO_2 recovery system (g CO_2/h)	(b21) A system recovering at least 50 % of the CO_2 generated during fermentation is implemented.

3.6. **Best environmental management practices in the production of meat and poultry meat products**

This section targets companies producing meat and poultry meat products (NACE code 10.13).

3.6.1. *High-pressure processing for decontamination of meat*

BEMP is to use high-pressure processing for pasteurisation and cooking processes in the production of meat and poultry meat products, in order to reduce energy use. High pressures can be used in different ways for:

— replacing thermal pasteurisation,

— reducing the cooking stage: by using high pressures, the cooking stage can be reduced as the complete pasteurisation is carried out during the high-pressure processing pasteurisation stage.

([1]) Council Directive 92/83/EEC of 19 October 1992 on the harmonization of the structures of excise duties on alcohol and alcoholic beverages (OJ L 316, 31.10.1992, p. 21) defines 'independent small brewery' as a brewery whose annual production does not exceed 200 000 hl.

Applicability

This BEMP is applicable to all producers of meat and poultry meat products, including SMEs. However, investment costs for purchasing the equipment are high and could discourage SMEs. When this is the case, SMEs can use a rental service for high-pressure processing, if available.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i58) Total energy use per amount of meat and poultry meat processed (kWh/kg of product) (i59) Energy use in high-pressure processing (kWh/cycle of processed product or kWh/kg of product)	(b22) High-pressure processing (owned or outsourced) is used to treat suitable meat products (e.g. cooked products, cured and cooked products, raw-cured).

3.7. Best environmental management practices in the manufacture of fruit juice

This section targets companies manufacturing fruit juice (NACE code 10.32).

3.7.1. *Value-added use of fruit residues*

It is BEMP to dispose of the fruit residues of the production process by following the priority cascade:

— recovery of valuable products, whenever feasible: e.g. pectin (from citrus and peach residues), fine chemicals (beta-carotenoids from carrot residues) and multifunctional food ingredients (from carrot, orange and apple residues) that can be used in bakery products,

— use of the fruit residues as animal feed, if there are any local livestock or animal feed producers interested in this by-product,

— use of the fruit residues as anaerobic digestion co-substrate in an already existing anaerobic digestion plant nearby or plan the construction of a new anaerobic digestion system together with other nearby organisations producing organic waste that could be processed in an anaerobic digestion plant (e.g. livestock farmers).

Applicability

This BEMP is applicable to all manufacturers of fruit juice, including SMEs, providing that local conditions (e.g. availability of local livestock to feed, presence of anaerobic digestion plants) allow the implementation of the options listed above.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i60) Fruit residue exploitation rate (%): total amount of fruit residues used for recovery of valuable products (e.g. pectin, essential oils), as animal feed or as co-substrate in an anaerobic digestion plant.	(b23) 100 % of the fruit residues are used for the recovery of valuable products (e.g. pectin, essential oils), as animal feed or as co-substrate for anaerobic digestion.

3.8. Best environmental management practices in cheese-making operations

This section targets companies producing cheese (NACE code 10.51).

3.8.1. *Recovery of whey*

BEMP is to recover all the whey from the production of cheese and to use it in new applications, according to the following priority list:

— concentrate, filter and/or evaporate the whey to produce whey powder, whey protein concentrate (WPC), lactose and other by-products,

— manufacture whey products intended for human consumption such as whey cheeses or whey drinks,

— feed the whey to animals, use it as a fertiliser or process it in an anaerobic digestion plant.

Applicability

This BEMP is applicable to all cheese producers, including SMEs, provided that local conditions (e.g. sufficient generation of whey for the implementation of a whey concentration system, market demand for whey-based products, availability of local livestock to feed) allow the implementation of the options listed above.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i61) Percentage (% weight) of the total dry matter weight of generated whey recovered for use in products intended for human consumption, in animal feed and as feed for anaerobic digestion. (i62) Percentage (% weight) of the total dry matter weight of generated whey recovered for use in products intended for human consumption	(b24) Whey is recovered and further treated in order to obtain other products for human consumption based on market demand. Excess whey is employed instead for animal feed or for anaerobic digestion.

3.9. **Best environmental management practices in manufacture of bread, biscuits and cakes**

This section targets companies producing bread, biscuits and cakes (NACE codes 10.71 and 10.72).

3.9.1. *Unsold bread waste reduction schemes*

BEMP is to establish appropriate bread 'take-back' schemes where the unsold bread from the points of sale is taken back to the bakery where it was produced. The collected bread is stored in the bakery and can be processed into bread-crumbs and dumplings or can be collected by licensed companies (e.g. charities or social organisations if bread is still suitable for human consumption as it is), or can be used for other purposes (e.g. animal feed). The collection of bread by licensed companies can also take place directly at the points of sale.

Applicability

This BEMP is applicable to all manufacturers of bread, including SMEs. Bakeries not delivering bread to distant points of sale can directly implement the measures listed above, without the need to set up a bread take-back scheme. Depending on the use that it is planned for the returned bread, appropriate handling, transport and storage must be ensured to meet hygiene requirements.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i63) Return rate (%) of unsold bread from points of sale participating in the 'take-back' scheme	(b25) For bakeries: 100 % of the points of sale selling the produced bread participate in an appropriate take-back scheme for the unsold bread

Environmental performance indicators	Benchmarks of excellence
(i64) Participation (%) of points of sale in existing returning schemes for a given area (i65) Percentage of unsold bread converted to other uses to avoid food waste generation (%)	

3.9.2. *Minimising energy consumption for baking*

BEMP is to minimise the energy consumption for baking by either operating existing ovens in the most energy-efficient way or by selecting the most efficient oven to cater for the specific baking needs based on: production requirements, energy sources, space constraints, temperature requirements, operation mode and heat transfer mode.

Applicability

This BEMP is applicable to all manufacturers of bread, biscuits and cakes, including SMEs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i66) Energy use in the baking process, i.e. kWh per: — t of baked product, or — t of input flour used, or — m^2 of baking area (oven surface)	—

3.10. **Best environmental management practices in manufacture of wine**

This section targets companies producing wine (NACE code 11.02).

3.10.1. *Reducing water use, organic waste generation and energy use in the winery*

BEMP is to:

— reduce water consumption in the winery by improving cleaning operations (Section 3.1.4) and installing highly water-efficient equipment,

— implement a strategic resource efficiency approach to organic residues generated in the winery, including actions, tailored to the specific case, such as: turning by-products into products for human consumption (e.g. distillation for alcohol from grape pomace); displacing synthetic fertilisers thanks to composting; recovering energy in combined heat, cooling and power plants (Section 3.1.8),

— reduce energy consumption by:

  — choosing energy-efficient equipment whenever there is a need for replacement or expansion, ensuring the proper sizing of the equipment selected (according to the process needs),

  — increasing the insulation of pipes, cooling lines, etc.,

  — regularly inspecting the heating/cooling pipes in the tanks in order to prevent and/or repair leaks or damage to their insulation,

  — designing highly energy-efficient cellars (i.e. select suitable orientation and location to reduce sun exposure, select construction materials with high U-values, and use green roofs and reflective paints and materials).

Applicability

This BEMP is applicable to all manufacturers of wine, including SMEs. However, there are some limitations to a number of the measures described above for existing wineries, where the applicability depends on the specific production processes already in place.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i67) Total water used in the winery (l) per litre of wine produced. Water used can also be measured at the process level. (i68) Organic waste generation in the winery (kg) per litre of wine produced per month/year (i69) Thermal energy use (kWh/l of wine produced): can be calculated annually or during the harvesting season (i70) Electricity use (kWh/l of wine produced): can be calculated annually or during the harvesting season	—

4. RECOMMENDED SECTOR-SPECIFIC KEY ENVIRONMENTAL PERFORMANCE INDICATORS

The following table lists **a selection** of key environmental performance indicators for the food and beverage manufacturing sector. These are a subset of all the indicators mentioned in Section 3. The table is divided by target group, according to the structure of this document:

— key indicators for all food and beverage manufacturers;

— additional key indicators for several subsectors within the food and beverage manufacturing sector, namely:

  — processing of coffee,

  — manufacture of olive oil,

  — manufacture of soft drinks,

  — manufacture of beer,

  — production of meat and poultry meat products,

  — manufacture of fruit juice,

  — cheese-making operations,

  — manufacture of bread, biscuits and cakes,

  — manufacture of wine.

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
ALL FOOD AND BEVERAGE MANUFACTURERS (NACE CODES 10 AND 11)							
Percentage of total sites or products assessed using a recognised environmental sustainability assessment protocol.	%	All food and beverage manufacturers	Production sites (i.e. production processes) and products that are assessed using carbon footprinting and/or life cycle assessments (LCAs) divided by the total number of production sites and products	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	A company-wide environmental sustainability assessment covering all operations is implemented. An environmental sustainability assessment for all new products under development is carried out.	BEMP 3.1.1
Percentage of ingredients or products meeting the company's specific sustainability criteria or complying with existing sustainability standards	%	All food and beverage manufacturers	Number or value in euro of ingredients or products purchased which meet the company's specific sustainability criteria or comply with existing sustainability standards divided by the total number or value of ingredients or products purchased	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	—	BEMP 3.1.2
Percentage of suppliers engaged in sustainability improvement programmes	%	All food and beverage manufacturers	Number of suppliers involved in sustainability programmes (in order to improve their environmental performance) out of the total number of suppliers. This indicator can also be calculated based on the value in euro of the products supplied by suppliers involved in sustainability programmes (in order to improve their environmental performance) out of the total value of products supplied	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	—	BEMP 3.1.2

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Packaging-related CO_2 emissions per weight/volume unit of product manufactured	Packaging gCO_{2eq}/g of product Packaging gCO_{2eq}/ml of product	All food and beverage manufacturers	Packaging-related CO_{2eq} per unit weight or volume of product manufactured calculated thanks to the use of an eco-design tool for packaging design	Per product	Energy efficiency	An eco-design tool is employed when designing packaging to identify options with a low environmental impact.	BEMP 3.1.3
Cleaning-related energy per unit of production	kWh/kg kWh/l kWh/number of products	All food and beverage manufacturers	Energy (heat and electricity) used for cleaning operations divided by the amount of product output expressed in weight, volume or number of products	Per production site	Energy efficiency	—	BEMP 3.1.4
Cleaning-related water use per unit of production	m^3/kg m^3/l m^3/number of products	All food and beverage manufacturers	Water used for cleaning operations divided by the amount of product output expressed in weight, volume or number of products	Per production site	Water	—	BEMP 3.1.4
Amount of cleaning product used per unit of production	kg/kg kg/l kg/number of products m^3/kg m^3/l m^3/number of products	All food and beverage manufacturers	Mass or volume of cleaning products (e.g. caustic soda) divided by the amount of product output expressed in weight, volume or number of products	Per production site	Material efficiency Emissions	—	BEMP 3.1.4

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Specific transport GHG emissions per product quantity	kg CO_{2eq}/m^3 kg CO_{2eq}/tonne kg CO_{2eq}/pallet kg CO_{2eq}/case	All food and beverage manufacturers	Total CO_{2eq} emitted during transport divided by the weight or volume or number of pallets/cases (according to relevance) transported	Company level	Material efficiency Emissions	For 100 % of transport and logistics operations (including third-party providers), the following indicators are reported: % of transport by different modes; kg CO_{2eq} per m^3/pallet etc. delivered.	BEMP 3.1.5
Specific transport GHG emissions per product quantity and distance	kg CO_{2eq}/tonne/km	All food and beverage manufacturers	Total CO_{2eq} emitted during transport divided by the weight of product transported and the distance travelled.	Company level	Material efficiency Emissions	For in-house transport and logistics operations, the following indicators are reported: truck load factor (% weight or volume capacity); kg CO_{2eq} per t·km.	BEMP 3.1.5
Percentage of transport by different modes	%	All food and beverage manufacturers	Percentage of different transport modes (e.g. road, rail, maritime, air) in the total transport activities. The percentage of transport by mode can be calculated based on tonne·km or sales value.	Company level	Material efficiency Emissions	For 100 % of transport and logistics operations (including third-party providers), the following indicators are reported: % of transport by different modes; kg CO_{2eq} per m^3/pallet etc. delivered.	BEMP 3.1.5

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Load factor for freight transport	% weight (kg) capacity % volume (m^3) capacity	All food and beverage manufacturers	Total load used (weight or volume) divided by the total available load (weigh or volume) for the mean of transport used for transporting products	Company level	Material efficiency Emissions	For in-house transport and logistics operations, the following indicators are reported: load factor for freight transport (% weight or volume capacity); kg CO_{2eq} per t·km.	BEMP 3.1.5
Vehicle fuel consumption for road transport	l/100 km	All food and beverage manufacturers	On-road actual fuel economy of road vehicles used for transporting products	Company level	Energy efficiency Emissions	Heavy goods vehicles' average fuel consumption less than or equal to 30 l/100 km.	BEMP 3.1.5
Specific total energy use of warehouses	kWh/m^2/kg net product	All food and beverage manufacturers	Total energy use of the warehouses (in terms of final energy) during a specific timespan (e.g. monthly, annual) divided by the relevant amount of throughput (e.g. kg net product)	Per production site	Energy efficiency	Temperature-controlled warehouse insulation is optimised.	BEMP 3.1.5
Percentage use of refrigeration systems running on natural refrigerants	%	All food and beverage manufacturers	Number of refrigeration/cooling systems using natural refrigerants divided by the total number of refrigeration/cooling systems.	Per production site	Emissions	Use 100 % refrigeration systems running on natural refrigerants in all sites.	BEMP 3.1.6
Energy efficiency ratio (EER)	kW (cooling capacity)/kW (electricity input)	All food and beverage manufacturers	Ratio between the cooling capacity and electricity input in a cooling/refrigeration system. The ratio can be calculated per single refrigeration system or for the entire production/refrigeration/freezing facility	Per production site	Energy efficiency	—	BEMP 3.1.6

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Overall energy use per unit of product	kWh/tonne kWh/EUR kWh/m^3 kWh/number of products	All food and beverage manufacturers	Energy (heat, cold and electricity) used in the production site divided by the amount of product output expressed in weight, value, volume or number of product	Per production site	Energy efficiency	A comprehensive energy management system (EnMS) is in place (e.g. ISO 50001). Regular energy auditing and monitoring are deployed to identify the main drivers of energy consumption. Appropriate energy efficiency solutions are implemented for all processes in a facility. Synergies in heat/cold/steam demand are exploited across processes, within the facility and neighbouring ones.	BEMP 3.1.7
Overall energy use per facility surface	kWh/m^2 of production facility	All food and beverage manufacturers	Energy (heat, cold and electricity) used in the production site over a specific timespan (e.g. annual, monthly) divided by the facility floor area	Per production site	Energy efficiency	A comprehensive energy management system (EnMS) is in place (e.g. ISO 50001). Regular energy auditing and monitoring are deployed to identify the main drivers of energy consumption. Appropriate energy efficiency solutions are implemented for all processes in a facility. Synergies in heat/cold/steam demand are exploited across processes, within the facility and neighbouring ones.	BEMP 3.1.7

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Overall energy use for specific processes	kWh	All food and beverage manufacturers	Energy (heat, cold and electricity) used over a specific timespan (e.g. annual, monthly) for a specific process (e.g. cleaning, cooking, refrigeration)	Per process	Energy efficiency	A comprehensive energy management system (EnMS) is in place, such as ISO 50001, which can be part of an environmental management system like EMAS. Regular energy auditing and monitoring are deployed to identify the main drivers of energy consumption. Appropriate energy efficiency solutions are implemented for all processes in a facility. Synergies in heat/cold/steam demand are exploited across processes, within the facility and neighbouring ones.	BEMP 3.1.7
Percentage of the energy use of production facilities met by renewable energy sources.	%	All food and beverage manufacturers	Renewable energy (heat and electricity separately) produced on site/nearby or purchased as certified renewable energy (e.g. renewable electricity) divided by the energy use of the production facilities (heat and electricity separately). The certification must ensure that the renewable energy purchased is not already accounted for by another organisation or in the national electricity average generating mix.	Per production site	Energy efficiency Emissions	Implement on-site or nearby renewable heat energy generation for suitable manufacturing processes. Process technologies are adapted to better match the supply of heat from renewables.	BEMP 3.1.8

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Ratio between the food waste generated and the finished products manufactured	tonnes of food waste/tonne of finished product	All food and beverage manufacturers	Tonnes of food waste (sent for recycling, recovery and disposal, including food waste used as a source of energy or for producing fertilisers) divided by tonnes of finished product	Per production site	Waste	—	BEMP 3.1.9
Relevant BAT are implemented	y/n	All food and beverage manufacturers	This indicator expresses if relevant Best Available Techniques (BAT) are implemented by the food and drink manufacturer. The relevance should be assessed by the food and drink manufacturer according to the environmental review of its activities and the relevant environmental aspects and pressures identified. The assessment should consider the specific size/conditions of operations and processes of the company.	Per production site	Emissions	A level of environmental performance which is within the best 10 % of each of the BAT-AE(P)L ranges defined in the FDM BREF is achieved.	BEMP 3.1.10
COMPANIES PROCESSING COFFEE (NACE CODE 10.83)							
Heat energy use in roasting operations	kWh/tonne of green coffee roasted	Companies processing coffee	Heating energy used (e.g. natural gas, propane) for roasting divided by the number of tonnes of green coffee roasted. It can be calculated per batch of coffee roasted or over a period (e.g. day, week, month)	Per production site	Energy efficiency Emissions	A green coffee preheating system is in-place.	BEMP 3.2.1

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
COMPANIES MANUFACTURING OLIVE OIL (NACE CODE 10.41)							
Water use in olive oil separation	l of water/tonne of olives processed l of water/l of olive oil manufactured	Companies manufacturing olive oil	Quantity of water used in olive oil separation (l) divided by the weight of olives processed or the volume of olive oil manufactured	Per production site	Water	Less than 50 l (5 %) of water used in olive oil separation per 1 000 l of olive oil manufactured.	BEMP 3.3.1
Water used to wash the olives upon reception	l of water/tonne of olives processed	Companies manufacturing olive oil	Quantity of water used to wash the olives upon reception (l) divided by the weight of olives processed (tonnes)	Per production site	Water	For olives delivered clean, no water (0 litres) is used to wash olives upon reception.	BEMP 3.3.2
COMPANIES MANUFACTURING SOFT DRINKS (NACE CODE 11.07)							
Energy use for blowing/drying	kWh/l	Companies manufacturing soft drinks	Energy used (kWh) for blowing/drying divided by the amount (l) of product manufactured	Per production site	Energy efficiency	—	BEMP 3.4.1
COMPANIES MANUFACTURING BEER (NACE CODE 11.05)							
Overall energy use during brewing	MJ/hl	Companies manufacturing beer	Energy used (heat and electricity) divided by the quantity of beer produced (hl) during a specific timespan. It can be calculated separately for electricity and heat.	Per production site	Energy efficiency	Install a wort preheating system with recovered heat from wort vapour condensing.	BEMPs 3.5.1, 3.5.2

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Evaporation rate during wort boiling	%	Companies manufacturing beer	Evaporation rate (%) in wort boiling is calculated as: 100 – (post-boil volume × 100/pre-boil volume)	Per production site	Energy efficiency	Evaporation rate during wort boiling is less than 4 %.	BEMP 3.5.1
Water consumption in the beer production process	hl water/hl beer	Companies manufacturing beer	Water consumption (hl) in the production process divided by the amount of beer produced (hl) during a specific timespan	Per production site	Water	—	BEMP 3.5.2
Percentage of CO_2 recovered from fermentation	%	Companies manufacturing beer	Amount of CO_2 which is recovered during beer production in the fermentation tanks/vessels, the maturation vessels and the bright beer tanks	Per production site	Energy efficiency Emissions	A system recovering at least 50 % of the CO_2 generated during fermentation is implemented.	BEMP 3.5.3
COMPANIES PRODUCING MEAT AND POULTRY MEAT PRODUCTS (NACE CODE 10.13)							
Total energy use for meat processing	kWh/kg product	Companies producing meat and poultry meat products	Energy use for the processing of meat and poultry meat as kWh divided by the amount (kg) of processed meat	Per process	Energy efficiency	—	BEMP 3.6.1
Energy use in high-pressure processing	kWh/cycle of processed product kWh/kg of product	Companies producing meat and poultry meat products	Energy use in high-pressure processing for the pasteurisation and cooking processes	Per process	Energy efficiency	High-pressure processing (owned or outsourced) is used to treat suitable meat products (cooked products, cured and cooked products and raw-cured etc.).	BEMP 3.6.1

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
COMPANIES MANUFACTURING FRUIT JUICE (NACE CODE 10.32)							
Fruit residue exploitation rate	%	Companies manufacturing fruit juice	Total amount (weight) of fruit residues used for recovery of valuable products (e.g. pectin, essential oils), as animal feed or as co-substrate in anaerobic digestion plants divided by the total amount of fruit residues	Per production site	Waste	100 % of the fruit residues are used for the recovery of valuable products (e.g. pectin, essential oils), as animal feed or as co-substrate for anaerobic digestion.	BEMP 3.7.1
COMPANIES PRODUCING CHEESE (NACE CODE 10.51)							
Percentage of the total dry matter weight of generated whey recovered for use in products intended for human consumption	%	Companies producing cheese	Amount (weight) of dry matter recovered from whey generated during the production of cheese which is used in products intended for human consumption divided by the total amount of dry matter recovered from whey	Per production site	Waste Emissions	Whey is recovered and further treated in order to obtain other products for human consumption based on market demand. Excess whey is employed instead for animal feed or for anaerobic digestion.	BEMP 3.8.1
COMPANIES PRODUCING BREAD, BISCUITS AND CAKES (NACE CODES 10.71 AND 10.72)							
Participation of points of sale in existing returning schemes	%	Companies producing bread	Number of points of sale (shops selling the bread produced by the bakery) taking part in the bread take-back scheme divided by the total number of points of sale selling the bread produced by the bakery.	Company	Waste	100 % of the points of sale selling the bread produced by the bakery participate in an appropriate take-back scheme for the unsold bread.	BEMP 3.9.1

Indicator	Common unit	Main target group	Short description	Recommended minimum level of monitoring	Related core indicator in accordance with Annex IV to Regulation (EC) No 1221/2009 (Section C.2)	Benchmark of excellence	Related best environmental management practice
Energy use in the baking process	kWh/t of baked product kWh/t of input flour used kWh/m² of baking area (oven surface)	Companies producing bread, biscuits and cakes	Energy used (e.g. electricity) during baking divided by amount of product output, ingredients inputs or baking area	Per production site	Energy efficiency	—	BEMP 3.9.2
COMPANIES PRODUCING WINE (NACE CODE 11.02)							
Total water used in the winery	l of water/l of wine produced	Companies producing wine	Total water used during a specific timespan (e.g. annually, monthly, harvest season) in the winery measured in litres divided by the amount of wine produced (l). Water used can also be measured at process level.	Per production site	Water	—	BEMP 3.10.1
Organic waste generation in the winery	kg/l of wine produced	Companies producing wine	Organic waste generated in the winery during a specific timespan (e.g. annually, monthly, harvest season) measured in kg divided by the amount of wine produced (l).	Per production site	Waste	—	BEMP 3.10.1
Energy used in the winery	kWh (heat)/l of wine produced kWh (electricity)/l of wine produced	Companies producing wine	Energy (heat and electricity) in kWh used in the winery during a specific timespan (e.g. annually, monthly, harvest season) divided by the amount of wine produced (l)	Per production site	Energy efficiency	—	BEMP 3.10.1