Council of the
European Union

Brussels, 25 July 2018
(OR. en)

11274/18
ADD 1

ENV 528

COVER NOTE

From:	European Commission
date of receipt:	17 July 2018
To:	General Secretariat of the Council
No. Cion doc.:	D056934/01 - Annex 1
Subject:	ANNEX to the Commission Decision on the sectoral reference document on best environmental management practices, sector-specific environmental performance indicators and benchmarks of excellence for the car manufacturing sector under Regulation (EC) No 1221/2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

Delegations will find attached document D056934/01 - Annex 1.

Encl.: D056934/01 - Annex 1

EUROPEAN
COMMISSION

Brussels, XXX
D 056934/01
[…](2018) XXX draft

ANNEX 1

ANNEX

to the

Commission Decision

on the sectoral reference document on best environmental management practices, sector-specific environmental performance indicators and benchmarks of excellence for the car manufacturing sector under Regulation (EC) No 1221/2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

(Text with EEA relevance)

TABLE OF CONTENTS

ANNEX

1. INTRODUCTION

This Sectoral Reference Document (SRD) for the car manufacturing sector is based on a detailed scientific and policy report[1] ("Best Practice Report") developed by 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 of the European Parliament and of the Council[4].

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 car 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.

[1] The scientific and policy report is publicly available on the JRC website at the following address: http://susproc.jrc.ec.europa.eu/activities/emas/documents/BEMP_CarManufacturing.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 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).

[4] 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 (OJ L 342, 22.12.2009, p. 1).

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 car 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.

<u>How SRDs should be taken into account by EMAS-registered organisations:</u>

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

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

   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.

2. 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[5] 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 other factors regarding environmental performance, 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.

[5] 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 <u>other relevant existing environmental performance indicators</u> 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.*"

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 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.

Structure of the sectoral reference document

This document consists of five 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 and 4 briefly describes the different Best Environmental Management Practices (BEMPs)[6] together with information on their applicability, for the manufacturing and end-of-life vehicle (ELV) subsector respectively. When specific environmental performance indicators and benchmarks of excellence could be formulated for a particular BEMP, these are also given.

[6] 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/BEMP_CarManufacturing.pdf. The reader is invited to consult it if interested to learn more about some of the best practices described in this reference document.

However, defining benchmarks of excellence was not possible for all BEMPs either because of the limited availability of data or because the specific conditions of each company and/or plant (diversity of manufacturing processes carried out in each manufacturing facility, level of vertical integration, etc.) vary to such an extent that a benchmark of excellence would not be meaningful. Even when benchmarks of excellence are given, these are not meant as targets for all companies to reach or metrics to compare the environmental performance across companies of the sector, but rather as a measure of what is possible to help individual companies assess the progress they made and motivate them to improve further. Some of the indicators and benchmarks are relevant for more than one BEMP and are thus repeated whenever appropriate. Finally, section 5 presents a comprehensive table with a selection of the most relevant environmental performance indicators, associated explanations and related benchmarks of excellence.

2. SCOPE

This reference document addresses the environmental performance of the car manufacturing sector and some aspects of the end-of-life vehicle handling sector. The target group of this document are companies belonging to the automotive manufacturing sector according to the following NACE codes (according to the statistical classification of economic activities established by Regulation (EC) No 1893/2006 of the European Parliament and of the Council[7]):

– NACE 29.1 Motor vehicle manufacture

– NACE 29.2 Manufacture of bodies for motor vehicles

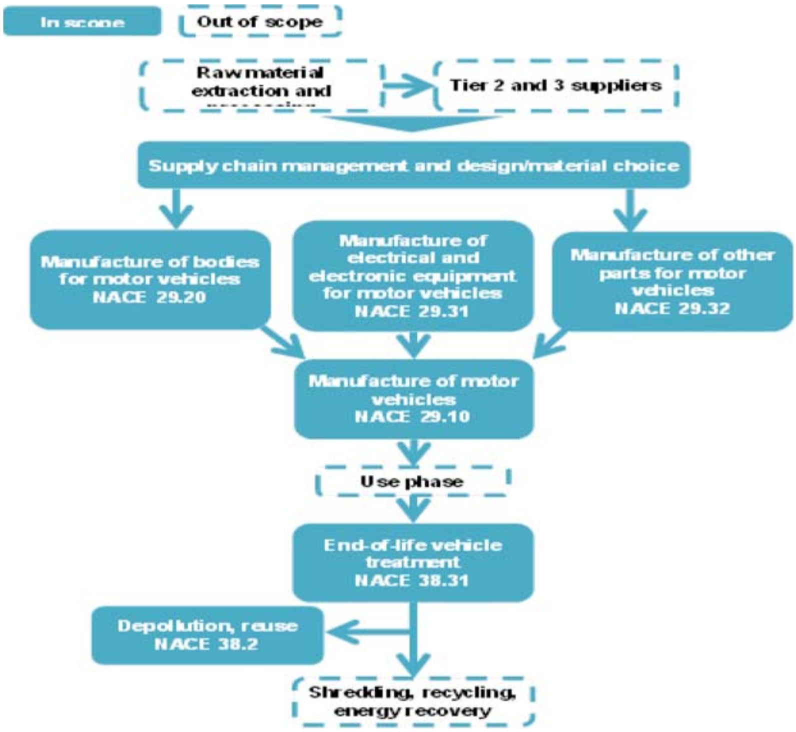
– NACE 29.3 Manufacture of parts and accessories for motor vehicles

– NACE 38.31 Dismantling of wrecks

In addition to the above, regarding ELV handling two additional activities can be considered which are subsets of wider areas: Recovery of sorted materials (NACE 38.32, including ELV shredding) and Wholesale of waste and scrap (NACE 46.77, including dismantling of ELV for obtaining and re-selling usable parts).

This reference document covers actions that automotive manufacturers and manufacturers of automotive parts and components can implement which results in improvements in the environmental performance over the whole automotive value chain, as presented in Figure 2-1. In the figure, the key sectors in the scope of this document are highlighted.

Figure 2-1: Overview of activities in the automotive manufacturing value chain



[7] 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).

Within the scope of car manufacturing activities, many process stages are covered, including: press shop, body-in-white production, paint shop, component and subassembly manufacturing, manufacturing of powertrain and chassis, pre-assembly and trim, and final assembly. In the present document, BEMPs have been developed to be as broadly applicable as possible for different types of plants. However, considering broad variations in vertical integration of the above activities within the same plant, direct evaluation and comparison of environmental performance between plants is difficult; therefore, the applicability and relevance of the best practices (as well as indicators and benchmarks) will have to be assessed in view of the characteristics of each facility.

The following table (Table 2-1) presents the most significant direct and indirect environmental aspects for the car manufacturing sector and which ones are included in the scope of this reference document. Additionally, Table 2-1 presents the main environmental pressures related to the most relevant environmental aspects and how these are tackled in this document: they are addressed either by BEMPs described in Sections 3 and 4 or by making reference to other available reference documents such as the Best Available Techniques (BAT) Reference Documents (BREFs[8], referenced here by their code).

Table 2-1: The most significant environmental aspects and pressures for the car manufacturing sector and how these are addressed in this reference document

Main environmental aspect	**Related environmental pressure**					**BEMPs**
	Energy / climate change	Resources / waste	Water	Emissions	Biodiversity	
Supply chain management						**BEMPs on supply chain management (Section 3.6)**
Engineering and design						**BEMP on design for sustainability (Section 3.6.3)** **BEMP on remanufacturing of components (Section 3.7.1)**
Manufacturing and assembly stage						
Press shop						Reference to the BEMPs for the Fabricated Metal Products manufacturing sector[9] **BEMPs for environmental, energy, waste, water and biodiversity management (Sections 3.1, 3.2, 3.3, 3.4, 3.5)**
Body-in-white						**BEMPs for environmental, energy, waste, water and biodiversity management (Sections 3.1, 3.2, 3.3, 3.4, 3.5)**

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

[9] The Best Environmental Management Practices for the Fabricated Metal Products manufacturing sector are currently under identification and more information and updates are published at: http://susproc.jrc.ec.europa.eu/activities/emas/fab_metal_prod.html.

Paint shop	Reference to BAT in BREFs for STS, STM
Manufacture of powertrain and chassis	Reference to the BEMPs for the Fabricated Metal Products manufacturing sector **BEMPs for environmental, energy, waste, water and biodiversity management (Sections 3.1, 3.2, 3.3, 3.4, 3.5)**
Manufacture of other components	Reference to BAT in BREFs for FMP, SF, IS, TAN, GLS, POL, TXT etc. Reference to the BEMPs for the EEE manufacturing sector[10]
Assembly lines	**BEMPs for environmental, energy, waste, water and biodiversity management (Sections 3.1, 3.2, 3.3, 3.4, 3.5)**
Plant infrastructure	**BEMPs for environmental, energy, waste, water and biodiversity management (Sections 3.1, 3.2, 3.3, 3.4, 3.5)**
Use phase	Out of scope, see Figure 2-1
End-of-life Vehicles (ELVs) stage	
Depollution	Reference to Directive 2000/53/EC of the European Parliament and of the Council [11] and Directive 2006/66/EC of the European Parliament and of the Council[12] **BEMP on implementing an advanced environmental management system (Section 3.1.1)** **BEMP on enhanced depollution of vehicles (Section 4.2.1)**
Salvage and reuse	Directive 2000/53/EC and Directive 2006/66/EC (see references above) **BEMP on implementing an advanced environmental management system (Section 3.1.1)** **BEMP on component and material take-back networks (Section 4.1.1)**
Dismantling and recycling of components	Directive 2000/53/EC and Directive 2006/66/EC (see references above) **BEMP on implementing an advanced environmental management system (Section 3.1.1)** **BEMP on plastic and composite parts (Section 4.2.2)**
Post-shredder treatment	Out of scope (Reference to BAT in the BREF for WT), see Figure 2-1

The environmental aspects presented in Table 2-1 were selected as the most commonly relevant in the sector. However, the environmental aspects to be managed by specific companies need to be assessed on a case by case basis.

---

10 The Best Environmental Management Practices for the Electrical and Electronic Equipment manufacturing sector are currently under identification and more information and updates are published at: http://susproc.jrc.ec.europa.eu/activities/emas/eeem.html.

11 Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles (OJ L 269, 21.10.2000, p. 34), known as the ELV Directive.

12 Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (OJ L 266, 26.9.2006, p. 1), known as the Batteries Directive.

In addition, the implementation of BEMPs remains a voluntary process which has to be adapted to the specific situation of each organisation. It is therefore important for stakeholders to prioritise the BEMPs which are most likely to be useful for them. The following table illustrates the specific stakeholders concerned by the present document which are most likely to find the BEMPs in each section of relevance:

Table 2-2 – Major target stakeholders per BEMP group (X= main target, (x)= also potentially relevant)

	Area	Key aspect	Stakeholders					
			OEMs[13]	Tier 1 suppliers	Tier 2 & other suppliers	Remanufacturers	ATFs[14]	Shredders
MANUFACTURING	CROSS CUTTING MANUFACTU-RING	Environmental management	X	X	X	X	X	(x)
		Energy management	X	X	X	X	X	(x)
		Waste management	X	X	X	X	X	(x)
		Water management	X	X	X	X	X	(x)
		Biodiversity	X	X	X	X	X	(x)
	SUPPLY CHAIN, DESIGN, AND REMANUFAC-TURING	Supply Chain Management, logistics and design	X	X	X			
		Remanufacturing	(x)			X		
END OF LIFE VEHICLE HANDLING	ELV logistics	Collection				(x)	X	
	ELV treatment						X	(x)

13 OEMs = Original Equipment Manufacturers, i.e. vehicle manufacturers in the automotive context.

14 ATFs = Authorised Treatment Facilities as defined in Directive 2000/53/EC on end-of life vehicles

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

3.1. BEMPs for environmental management

This section is relevant for automotive vehicles, parts and components manufacturers as well as broadly relevant for authorised end-of-life vehicle treatment facilities.

3.1.1. Implementing an advanced environmental management system

BEMP is to implement an advanced environmental management system (EMS) across all sites of the company. This enables continuous monitoring and improvement across all most significant environmental aspects.

An EMS is a voluntary tool that helps organisations to develop, implement, maintain, review and monitor an environmental policy and improve their environmental performance. Advanced systems can be implemented according to ISO 14001-2015 or preferably EMAS, which are internationally recognised systems certified or verified by a third party, and focus on continuous improvement and benchmarking of the organisation's environmental performance.

Applicability

An EMS is typically suitable for all organisations and sites. The scope and nature of the EMS may vary depending on the scale and complexity of the organisation and of its processes, as well as the specific environmental impacts involved. In some cases, aspects of water management, biodiversity or land contamination may not be covered or monitored in EMSs implemented by firms in the automotive sector; this reference document (Sections 3.2, 3.3, 3.4 and 3.5) may offer useful guidance on these aspects.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmark of excellence**
(i1) Sites with an advanced environmental management system (% of facilities/operations) (i2) Number of environmental performance indicators that are in general use throughout the whole organisation and/or which are reported on in environmental statements; (i3) Use of internal or external benchmarks to drive environmental performance (Y/N)	(b1) An advanced environmental management system is implemented across all production sites globally

3.2. BEMPs for energy management

This section is relevant for automotive vehicles, parts and components manufacturers. The main principles are also broadly relevant for authorised end-of-life vehicle treatment facilities.

3.2.1. Implementing detailed energy monitoring and management systems

BEMP is to implement across manufacturing sites detailed energy monitoring at the process level, in conjunction with an energy management system that is certified or verified by a third party, in order to optimise energy consumption.

Best practice energy management plans include the following aspects and these are formalised according to a management system that requires organisational improvements, such as a system certified ISO 50001 or integrated in EMAS:

– Establishing an energy policy, strategy, and action plan;

– Gaining active commitment from senior management;

– Performance measurement and monitoring;

– Staff training;

– Communication;

– Continuous improvement;

– Investment.

Applicability

An energy management system certified ISO 50001 or integrated in EMAS is applicable to any plant or site.

Introducing detailed energy monitoring and management systems, while not systematically essential, can be beneficial for any facility and should be considered at the appropriate level to promote action.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i4) Number of facilities with detailed energy monitoring systems (# or % of facilities/operations) (i5) Number of facilities with an energy management system certified ISO 50001 or integrated in EMAS (# or % of facilities/operations)	(b2) Specific energy management plans are implemented across all sites (organisation level) (b3) Detailed monitoring per process is implemented on-site (site level) (b4) The plant implements energy management controls, e.g. to switch off areas of the plant during non-productive times for sites with detailed monitoring (site level)

3.2.2. Increasing the efficiency of energy-using processes

BEMP is to ensure that high levels of energy efficiency are maintained, by conducting regular reviews of energy-using processes and identifying options for improved controls, management, repairs and/or equipment replacement.

Major principles that can be followed to increase energy efficiency across facilities are:

– Carrying out energy performance reviews;

– Automation and timing for base-load reduction;

– Zoning;

– Checks for leaks and losses;

– Installing insulation over pipes and equipment;

– Seeking opportunities to install heat recovery systems such as heat exchangers;

– Installing cogeneration systems (combined heat and power (CHP));

– Retrofitting;

– Switching or combining energy sources.

Applicability

The techniques mentioned in this BEMP are applicable in principle for both new plants and existing installations. However, the potential for optimisation is usually greater in existing installations which have developed organically over many years to meet the evolving constraints of production, where synergies and rationalisations may deliver more obvious results.

Not all plants will be able to implement cogeneration (CHP): in plants with little thermal process or heat requirements, cogeneration will not be a cost-effective strategy.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i6) Implementation of regular reviews of systems, automation, repair, maintenance and upgrades (% of sites) (i7) Overall energy use (kWh) per functional unit[15]	-

3.2.3. Renewable and alternative energy use

BEMP is to use renewable energy, generated on-site or off-site, to meet the energy needs of an automotive manufacturing facility.

After striving to reduce energy use as much as possible (see Section 3.2.2), renewable or alternative energy sources that can be considered include:

– On-site renewables, e.g. solar thermal, solar photovoltaic panels, wind turbines, geothermal, biomass or hydroelectric generation;

– Alternative (potentially lower-carbon) on-site sources such as combined heat and power (CHP) or trigeneration;

– Purchase of off-site renewable energy, either directly or through major utilities.

Applicability

[15] In this and in several other indicators, the term 'functional unit' refers to a unit of output, of activity or resource use chosen by each organisation to reflect what is most relevant for its specific case (and can be adapted depending on the site, environmental aspect considered, etc.). Typical metrics (usually counted over a reference period, e.g. 1 year) in use through industry as functional units include e.g.:
- number of units (vehicles, engines, gearboxes, parts…) produced
- turnover in €
- added value in €
- output measured in kg
- full time equivalent (FTE) employees
- man-hours worked

The achievability, cost and technologies required will vary significantly depending on the local renewable resource. The feasibility of on-site renewable energy generation varies widely according to factors specific to the general area and the site itself such as climate, terrain and soil, shading and exposure and available space. Planning permits can also be an administrative hurdle specific to the jurisdiction.

Off-site energy purchase is more generally applicable, either through partnering with energy producers (e.g. on a local scale) or simply selecting a renewable energy option from a utility company, which is becoming a mainstream offering in most Member States.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i8) Share of production sites assessed for potential and opportunities for use of renewable energy sources (%) (i9) Share of site energy use met by renewable sources (%) (i10) Energy consumption from fossil fuels (MWh or TJ) per functional unit	(b5) All production sites are assessed for potential use of renewable energy sources (b6) Energy use is reported, declaring the share of fossil and non-fossil energy (b7) A policy is in place to drive an increase in renewable energy use

3.2.4. Optimisation of lighting in automotive manufacturing plants

BEMP is to reduce energy use for lighting through a combination of optimal design, positioning, using efficient lighting technologies and zonal management strategies.

An integrated approach to optimise lighting energy efficiency needs to take into account the following elements:

– Space design: wherever possible, using daylight in combination with artificial light;

– Optimising the positioning and distribution of luminaires: height and space between luminaires, within the constraints on maintenance, cleaning, reparability and cost;

– Increasing the efficiency of lighting devices: choice of efficient technical solutions (at system level) which deliver sufficient brightness for safe working;

– Management of lighting on a “zonal” basis: lighting is switched on or off according to requirements and presence.

Combining the measures above can be the most effective and comprehensive way to reduce the energy use for lighting.

Applicability

This BEMP is generally applicable, although different lighting technologies have different fields of application and limitations which may make some of them unsuitable for certain work environments.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i11) Implementation of improved positioning, energy-efficient lighting (% of lighting areas within a site, % of total sites). (i12) Implementation of zonal strategies for lighting (% of	(b8) The most energy efficient lighting solutions appropriate to specific work place

lighting areas within a site, % of total sites). (i13) Energy use of lighting equipment[16] (kWh/year for a plant) (i14) Average efficacy of luminaires throughout plant (lm/W)	requirements are implemented at all sites (b9) Zoning schemes are introduced in all sites

3.2.5. Rational and efficient use of compressed air

BEMP is to reduce energy consumption by mapping and assessing the use of compressed air, by optimising compressed air systems and eliminating leaks, by better matching supply and demand of air, by increasing the energy efficiency of compressors and by implementing waste heat recovery.

Compressed air usage can be optimised according to a vast portfolio of measures in three areas:

– Demand-side measures:
  - Avoid and replace misuse of compressed air;
  - Review usage of compressed air tools;
  - Monitor and control demand;
  - Set up awareness programmes;

– Distribution network and system measures:
  - Identify and minimise leaks;
  - Depressurisation;
  - Zoning;
  - Use of valves;

– Supply-side measures:
  - Size and manage compressor system according to demand;
  - Increase the overall energy efficiency of the compressed air system;
  - Regular inspection of system pressure;
  - Increase the energy efficiency of major system components;
  - Regular filter inspection;
  - Energy efficient dryers and optimal drain selection;
  - Install waste heat recovery.

Applicability

The approaches for improving the energy efficiency of compressed air systems can be applied by all companies that have such a system at their disposal, regardless of size.

The substitution of compressed air devices as well as the elimination of leakages is broadly applicable for all systems, independent of their age and current state.

16 If measured at detailed level.

Concerning the optimisation of systems design, the recommendations are especially relevant for systems that have expanded over decades – it is estimated that this approach is applicable for at least 50% of all compressed air systems.

Regarding the use of waste heat, a continuous demand for process heat is necessary in order to realise the existing energy and cost savings potentials.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i15) Electricity use of the compressed air system per unit of volume at the point of end use (kWh/m³ of delivered compressed air)	(b10) The energy use of the compressed air system is lower than 0.11 kWh/m³ of compressed air delivered, for large installations operating at a gauge pressure of 6.5 bar, with volume flow normalised at 1013 mbar and 20°C, and pressure deviations not exceeding 0.2 bar. (b11) After all air consumers are switched off, the network pressure remains stable and the compressors (on standby) do not switch to load condition.

3.2.6. Optimisation of electric motor usage

BEMP is to reduce electricity consumption through the optimal use of electric motors, in particular using variable speed drives to adapt motor speed to demand, typically for applications such as pumps.

Electric motors are present in most manufacturing processes, and can be optimised for higher efficiency. Preliminary steps include exploring possible options for reducing the motors' load, and a review of power quality, motor controls and motor and transmission efficiency. Replacement can be considered, as modern, energy-efficient motors may reduce energy consumption by up to 40% over older models.

A further improvement for variable speed/load applications is to install variable-speed drives (VSDs) to adapt the operation of the motor electronically with minimal losses. This is particularly relevant, and holds the largest savings potential, for common application such as pumps and fans. Short payback often makes these investments economically attractive.

Applicability

The type of load and appropriate electric motor must be considered first before assessing the improvement potential of optimisation. Retrofitting constitutes the biggest potential for optimisation, after evaluating whether a motor of smaller nominal power can be installed (if the load is reduced) and considering e.g. size, weight and starting capability. However, also in new build or new purchases, adapting the choice of motor as closely as possible to usage will have the potential for optimised operation.

When considering the VSD installation, the main negative effects that need to be considered are harmonic distortion, cooling problems at low rotational speeds, and mechanical resonance at certain rotational speeds.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**

(i16) Share of electric motors with VSD installed (% of total installed power or of total number) (i17) Share of pumps with VSD installed (% of total installed power or of total number) (i18) Average pump efficiency (%)	.

3.3. BEMPs for waste management

This section is relevant for automotive vehicles, parts and components manufacturers as well as broadly relevant for authorised end-of-life vehicle treatment facilities.

3.3.1. Waste prevention and management

BEMP is to set up an overall organisational waste management strategy with high level targets for waste minimisation, and to apply it at the site level with tailored waste management plans that minimise waste production during operations and establish strategic partnerships in order to find markets for the remaining waste fractions.

An effective organisational waste management strategy aims to avoid ultimate disposal by following the waste hierarchy[17] i.e. in order of priority:

- Reduce through forward planning, prolonging the product's life before it becomes waste, improved methods of manufacturing, and the management of supply chain waste;
- Reuse materials in their current form;
- Recycle by putting in place:
  - Collection and segregation;
  - Measurement and monitoring of waste generation;
  - Procedures and methodologies;
  - Provision of waste logistics;
  - Partnerships and stakeholder engagement;
- Recover energy from waste through combustion or more advanced techniques.

Applicability

Limited local recycling infrastructure and waste disposal regulations in certain regions can be a barrier to diverting waste from landfill. In those cases, working with local stakeholders is an important aspect of the waste management plan.

The choice of the most appropriate waste treatment options involves consideration of logistics as well as material properties and economic value.

[17] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3), known as the Waste Framework Directive, introduces an order of preference for action to reduce and manage waste. This is known as the waste hierarchy. It set the highest priority on waste prevention, followed by waste re-use, then recycling and then (energy) recovery of waste fractions that cannot be prevented, re-used or recycled. Finally, waste disposal is only to be considered when none of the previous routes are possible.

SMEs may not be able to afford the capital cost of some waste reduction techniques which can require new equipment, training or software.

Finally, highly ambitious objectives such as zero waste to landfill may not be achievable for some facilities depending on the degree of vertical integration of the processes in the plant.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i19) Waste generation per functional unit (kg/functional unit) (i20) Hazardous waste generation per functional unit (kg/functional unit) (i21) Waste sent to specific streams, including recycling, energy recovery and landfill (kg/functional unit, % total waste). (i22) Establishment and implementation of an overarching waste strategy with monitoring and targets for improvements (Y/N) (i23) [For multi-site organisations] Number of sites with advanced waste management plans in place (#) (i24) [For multi-site organisations] Number of sites achieving zero waste to landfill (#)	(b12) Waste management plans introduced [in all sites] (b13) Zero waste sent to landfill from all production and non-production activities/sites

3.4. BEMPs for water management

This section is relevant for automotive vehicles, parts and components manufacturers. The main principles are also broadly relevant for authorised end-of-life vehicle treatment facilities.

3.4.1. Water use strategy and management

Water management is an issue of increasing concern that is typically not covered in detail in standard environmental management systems. Therefore BEMP is to implement monitoring and to conduct a review of water management issues according to a recognised consolidated framework for water management which allows organisations to:

- Assess water usage and discharge;
- Assess risks in local watershed and supply chain;
- Create a plan on how to use water more efficiently and improve wastewater discharge;
- Collaborate with the supply chain and other organisations;
- Hold the organisation and others accountable;
- Communicate results.

Applicability

Water management is a highly localised issue: the same level of water consumption could put extreme strain on the available water resources in water-scarce regions, while presenting no issues in areas with abundant water supplies. The efforts put by companies in water management needs thus to be proportional to the local situation.

There are challenges associated with collecting sufficient data for a full water impact assessment. Therefore organisations should prioritise their efforts to focus on the most water-intensive processes, areas and products, as well as those in areas that are considered to be at high risk of water scarcity.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i25) Water use per functional unit (m^3/functional unit) (i26) Sites that have conducted a water strategy review (% of facilities/operations) (i27) Sites that have monitoring for water use (%) (i28) Sites that have separate water monitoring for production processes and sanitary use (%)	(b14) Introduction of a water strategy according to a recognised tool, such as the CEO Water Mandate, integrating an assessment of water scarcity (b15) Water use on-site is measured per site and per process, if appropriate, using automated software

3.4.2. Water-saving opportunities in automotive plants

BEMP is to minimise water use at all facilities, regularly review the implementation of water efficiency measures and ensure that the majority of practices and appliances are classified as highly efficient.

The potential of water saving throughout the plant[18] can be captured by:

– Avoiding water use:
  - Dry sweep all areas before hosing;
  - Eliminate leaks;
  - Use alternatives to liquid ring pumps;

– Reducing water use:
  - Improve efficiency of operations;
  - Install flow restrictors on tap water supply line;
  - Use water efficient nozzles for spray rinsing/hosing;
  - Use timer rinse controls;
  - Install water efficient staff amenities;
  - Use ultrasonic cleaning processes;
  - Counter-flow rinsing;

[18] This BEMP does not specifically address paint shops (where significant water savings can be realised), as existing guidance is available in the relevant BREFs (STS, STM).

- Inter-stage rinsing.

Applicability

Water-saving devices are broadly applicable and do not compromise performance, if chosen and installed correctly.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i25) Water use per functional unit (m³/functional unit) (i29) Share of operations in existing sites retrofitted with water-saving sanitary devices and processes (%) (i30) Share of new sites designed with water-saving devices and processes (%)	(b16) All new sites are designed with water-saving sanitary devices and retrofitting of water-saving devices is phased in across all existing sites

3.4.3. Water recycling and rainwater harvesting

BEMP is to avoid/eliminate the use of high-quality water in processes where this is not necessary, as well as increase reuse and recycling to meet remaining needs.

For many uses such as cooling water, toilet and urinal flushing, vehicle/component washing and non-crop irrigation, it is possible to replace drinking, or high-quality water with recovered water from rain collection or water recycled from other uses.

Installing these systems usually requires the following elements:

– for wastewater recycling systems:
  - pre-treatment tanks;
  - treatment system;
  - pumping;

– for rainwater harvesting systems:
  - catchment area;
  - conveyance system;
  - storage device;
  - distribution system.

Applicability

Water recycling systems can be designed into all new buildings. Retrofitting to existing buildings is expensive and may be impractical unless the building is undergoing extensive renovation.

The economic feasibility of rainwater harvesting systems is highly dependent on the climate.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i25) Water use per functional unit (m³/functional unit) (i31) Installation of a wastewater recycling system (Y/N) (i32) Installation of a rainwater recycling system (Y/N) (i33) Yearly quantity of rainwater use and wastewater reuse (m^3/yr) (i34) Percentage of total water use met by recycled rain- or wastewater (%).	(b17) "Closed loop" water recycling is implemented with recovery rate of at least 90% where feasible (b18) 30% water needs are met by harvested water (in regions with sufficient rainfall)

3.4.4. Green roofs for storm water management

BEMP is to install or retrofit green roofs on industrial sites, particularly in environmentally sensitive areas where management of storm water runoff is important.

Installing green roofs where structurally possible can contribute to the following objectives:

- Water attenuation especially from severe weather events;
- Increased roof lifespan (reduced material consumption);
- Insulating effect (reduce HVAC energy consumption);
- Biodiversity conservation;
- Improved water quality.

Applicability

Green roofs are applicable to many existing and new building designs, but in practice, few locations are eligible for a wide-scale deployment of the solution. Limitations include the actual risk of storm events; structural constraints on the building; access to sunlight; moisture; waterproofing; existing roof systems; and the management of collected rainwater.

In addition, this use of the roof has to be weighed against other environmentally beneficial uses, such as the installation of solar (thermal/PV) energy systems and daylight inflow.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i35) Percentage of sites that are suitable for green roofs with green roofs installed (%) (i36) Water holding capacity of the green roof: share of water retention (%), water run off (m3); (i37) Cooling effect: reduction in energy demand for HVAC (MJ); (i38) Qualitative biodiversity indicators (e.g. number of	-

species living in the roof), depending on local conditions.	

3.5. BEMPs for biodiversity management

This section is relevant for automotive vehicles, parts and components manufacturers. The main principles are also broadly relevant for authorised end-of-life vehicle treatment facilities.

3.5.1. Review and strategy of ecosystems and biodiversity management throughout the value chain

BEMP is to conduct an ecosystem management review so that the impacts of ecosystem services throughout the value chain can be clearly understood, and to work with relevant stakeholders to minimise any issues.

Organisations can follow methodologies such as the Corporate Ecosystem Services Review (developed by the World Resources Institute with the WBCSD), which consists of five steps:

- Select the scope;
- Identify priority ecosystem services (qualitative);
- Analyse trends in priority services;
- Identify business risks and opportunities;
- Develop strategies.

Applicability

Ecosystem reviews can be readily implemented by companies of all sizes, with varying degrees of detail and depth in the supply chain. The approaches outlined consist in mainstreaming biodiversity management in the (environmental) management plan of the organisation, and can therefore readily link with many other existing company processes and analytical techniques, such as life cycle assessments, land management plans, economic impact assessments, company reporting, and sustainability appraisals.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i39) Application of methodologies to assess ecosystem services to the value chain (Y/N or % coverage); (i40) Coverage of relevant scope, as determined by prioritisation (Y/N or % coverage).	(b19) A high-level ecosystem review is conducted across the value chain, followed by a more detailed ecosystem review in identified high risk areas (b20) Strategies to mitigate issues in the identified priority areas of the supply chain are developed, in collaboration with local stakeholders and external experts

3.5.2. Biodiversity management at site level

BEMP is to improve direct impacts on biodiversity on company premises by measuring, managing and reporting on biodiversity efforts, working with local stakeholders.

Three key steps are essential in improving biodiversity impacts on site:

- Measuring biodiversity to track an organisation's positive and negative impacts on biodiversity, e.g. focussing on land use, environmental impacts and protectable species. Best practice includes e.g. location-based biodiversity or risk screenings, including assessment of the surrounding areas, and measurement according to indicators and species inventories.
- Management and collaboration with stakeholders: Managing the site to promote and maintain biodiversity, conducting ecological compensation measures, while working with specialist organisations involved in biodiversity and educating staff and contractors.
- Reporting: sharing information with stakeholders about an organisation's activities, impacts, and performance in relation to biodiversity.

Applicability

Many of the approaches are generally applicable and can be introduced at any time during site operation. Existing sites may have little or no open space available for new development, although some solutions can make use of already constructed surfaces (see Section 3.4.4).

One issue facing the organisations implementing this BEMP is the threat that the areas dedicated to biodiversity may become protected, impending future use for e.g. planned long-term extensions.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i41) Number of collaboration projects with stakeholders to address biodiversity issues (#) (i42) Procedure /instruments are in place to analyse biodiversity related feedback from customers, stakeholder, suppliers (Y/N). (i43) Inventory of land or other areas, owned, leased or managed by the company in or adjacent to protected areas or areas of high biodiversity value (m^2). (i44) Plan for biodiversity friendly gardening in place for premises or other areas, owned, leased or managed by the company (Y/N). (i45) Biodiversity Index (to be developed according to local conditions)	(b21) A comprehensive biodiversity plan is in place to ensure systematic incorporation of biodiversity issues through measurement, monitoring and reporting (b22) Cooperation with experts and local stakeholders is in place

3.6. BEMPs for value chain management and design

This section is relevant for automotive vehicles, parts and components manufacturers.

3.6.1. Promoting environmental improvements along the supply chain

BEMP is to require all major suppliers to have certified environmental management systems, set targets for environmental criteria and conduct audits of high risk suppliers to ensure compliance. This is supported by training of and collaboration with suppliers to ensure that their environmental performance improves.

Front runner organisations strive to improve environmental performance in their supply chain by:

- Tracking materials using the IMDS (International Material Data System);
- Requiring direct suppliers to have certified or verified environmental management systems;
- Setting environmental improvement goals and collaborating with Tier 1 suppliers on how to achieve them (typically to: reduce waste and increase recycling; reduce energy consumption and CO_2 emissions; increase the percentage of sustainable materials in purchased components; and improve biodiversity);
- Supporting suppliers to improve their environmental impact;
- Monitoring and enforcement.

Applicability

Many OEMs require all of their Tier 1 suppliers to agree to the same general environmental code of conduct that is integrated into purchasing agreements. Initially it may be beneficial to concentrate on Tier 1 suppliers that represent the largest share of total purchasing budget or those with high environmental impacts. Auditing of Tier 1 suppliers requires a significant effort that appears feasible only for larger organisations that already practice close inspection of supplier operations. In the longer term the requirements can be rolled out to more suppliers.

Regarding the applicability of this best practice to Tier 1 supplier themselves rather than OEMs, suppliers should take into account the leverage that the organisation is able to use in order to cascade up requirements to their own suppliers, in view of their own size or purchasing capability and relative weight in their own suppliers' portfolio.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i46) Share of Tier 1 (direct) suppliers (by number or by purchasing budget/value) that comply with required standards according to internal or external audits (%) (i47) Self-assessment questionnaires sent to direct high risk suppliers (Y/N) (i48) Direct supplier development and training undertaken (Y/N)	(b23) All major suppliers are required to have an environmental management system in order to qualify for purchasing agreements (b24) Environmental criteria are set across all environmental impact areas for purchasing agreements (b25) All direct suppliers are sent self-assessment questionnaires and high risk suppliers are audited by customers or third parties (b26) Direct supplier development and training is undertaken (b27) Enforcement procedures are defined for non-compliance

3.6.2. Collaborate with suppliers and customers to reduce packaging

BEMP is to reduce and reuse packaging used for materials and components supply.

This best practice is based on the following principles:

- – Reduce unnecessary packaging while ensuring adequate functionality (parts integrity, ease of access);
- – Investigate alternative materials for packaging which are either less resource intensive, or easier to reuse / recycle;
- – Develop reverse logistics for returning empty packaging to suppliers / recuperate from customers in a closed loop;
- – Investigate alternative uses for disposable packaging to divert from disposal (higher up in the "waste hierarchy"[19]).

Applicability

These principles are broadly applicable to all packaging currently in use. The concrete feasibility of innovative solutions will be limited by the willingness of suppliers or customers to collaborate with the scheme.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i20) Waste generation per functional unit (kg/functional unit) (i49) Packaging waste generation per functional unit (kg/functional unit) (i50) Packaging waste generation per site or maintenance group (kg/site, kg/maintenance group)	-

3.6.3. Design for sustainability using Life Cycle Assessment (LCA)

Conducting life cycle assessment (LCA) helps to identify potential improvements and trade-offs between different environmental impacts, as well as helping to avoid shifting environmental burdens from one part of the product life cycle to another.

BEMP is to perform LCAs extensively during the design phase, to support the setting of specific goals for improvement in different environmental impacts and to ensure that these targets are met; and to support decision making by using LCA tools in order to:

- Ensure sustainability of resources;
- Ensure minimal use of resources in production and transportation;
- Ensure minimal use of resources during the use phase;
- Ensure appropriate durability of the product and components;
- Enable disassembly, separation and purification;
- Enable comparisons among different kinds of mobility concepts.

Applicability

[19] See Section 3.3.1.

In principle, there are no limits to the applicability of LCA to inform design decisions at the level of the vehicle, as well as individual parts and materials. However, most SMEs lack the expertise and resources to address the requests for life cycle environmental performance information, and additional support may be needed.

There are also limits to current LCA methodologies, as some impact categories are not well accounted for in LCA methodologies – for example, biodiversity loss and indirect effects due to displacement of agricultural production.

LCA can be an ineffective tool for comparison of vehicles inter-OEM, as the boundaries, parameters and data sets used can differ considerably, even when following ISO standard guidelines. Indeed it was not a goal of the tool when initially developed. However – as is the case for environmental management systems such as EMAS – LCA is very useful to measure the improvement that a company can achieve on the environmental performances of its products, typically with the comparison of a vehicle with its own predecessor of the same product line.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	**Benchmarks of excellence**
(i51) Conducting LCA of the main product lines to support design and development decisions (Y/N) (i52) Improvements in environmental indicators (CO_2, energy consumption, pollution etc.) for new model designs in the main product lines compared to previous model designs (%) (i53) Conduct comparisons among different kinds of mobility concepts (Y/N)	(b28) LCA is conducted for main product lines according to ISO 14040:2006 standards or equivalent (b29) Targets are set to ensure continuous improvements in the environmental impacts of new vehicle designs

3.7. BEMPs for remanufacturing

This section is relevant for automotive vehicles, parts and components manufacturers.

3.7.1. General best practices for remanufacturing components

Achieving greater levels of remanufacturing has a significant impact on the conservation of materials and energy savings.

BEMP is to increase the scale of remanufacturing activities, establishing procedures to ensure the high quality of remanufactured parts while reducing environmental impacts and scaling up activities to cover more components.

Applicability

Typically, remanufacturing is viable for products with higher resale values, and markets for some components are already mature (e.g. starters, alternators etc.). Other areas are at an earlier stage of development (such as electrical and electronic components) where the complexity is much greater, and there is considerable potential for market growth in these areas. Remanufacturing may also be helpful in situations where previous product generations are still in the marketplace and require maintenance, but are no longer in production.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i54) Level of remanufacturing (weight per component (%)) (i55) Overall remanufacturing levels (% of recovered components).	-

4. BEST ENVIRONMENTAL MANAGEMENT PRACTICES, SECTOR ENVIRONMENTAL PERFORMANCE INDICATORS AND BENCHMARKS OF EXCELLENCE FOR THE END-OF-LIFE VEHICLE HANDLING SECTOR

4.1. BEMPs for ELV collection

This section is relevant for authorised end-of-life vehicle treatment facilities.

4.1.1. Component and material take-back networks

BEMP is to deploy effective take-back networks to increase the rate of reuse, recycling and recovery that is economically achievable when treating ELVs. This involves extensive collaboration between different industry actors to recuperate components, consolidate with other waste streams where possible as well as training and support.
Front-runner authorised treatment facilities have implemented best practice through:

- Collaboration with industry actors: to coordinate the tracking, collection and transportation of components and materials and to ensure that the right incentives are in place for actors in the chain;
- Managing/incentivising product return;
- Consolidation with other waste streams, to reduce the administrative burdens and pool expertise;
- Providing technical support and awareness-raising.

Applicability

The greatest potential environmental gains appear to be in collecting advanced technologies with limited service life (such as hybrid or electric vehicle batteries), as well as components/materials that are less financially attractive to dismantle (such as plastic and glass components). With respect to managing/incentivising product return, the applicability of alternative business models (if at all) depends on local regulation, the customer base, the geographic dispersion and the type of product involved.
In some Member States, take back schemes could face competition from the informal sector for dismantling of ELVs.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i56) Rate of specific products or materials recuperated through ELV networks (%)	(b30) Collaboration and partnerships are in place with local/national organisations to implement take-back networks

4.2. ELV treatment

This section is relevant for authorised end-of-life vehicle treatment facilities.

4.2.1. Enhanced depollution of vehicles

BEMP is to carefully carry out the mandatory depollution of vehicles using specifically designed equipment where possible. Environmental considerations are relevant to contamination of soil and water, but also related to the potential for recuperating materials for reuse and recycling.

Best practice is to have in place effective depollution systems such as:

- Equipment which safely drills fuel tanks and hydraulically removes fuel;
- Drainage/collection equipment for oils, hydraulic fluids etc.; and to remove oil from shock absorbers;
- Tools to remove the catalytic converter;
- Equipment for removal and safe storage of air conditioning gases;
- Equipment for airbag detonation and;
- Equipment for removal of seat belt tensioners;

or to use alternative methods to achieve the same levels of depollution.

Applicability

Depollution rates will be affected by whether an end-of-life vehicle treatment facility specialises in a certain type of vehicle (e.g. vehicle size). Certain other factors will also be required, for instance commercial depollution machines in some cases, or adequate storage and treatment facilities, to ensure depollution is non-hazardous to the environment.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i57) Removal rate of components (%) (i58) Recycling rate of fluids (%) (i59) Installation of commercial depollution machine or equally performing equipment (Y/N) (i60) Use of mass balancing techniques to monitor depollution rates (Y/N) (i61) Adoption of a quality management system (Y/N)	(b31) A certified quality management system is in place in the organisation

4.2.2. General best practices for plastic and composite parts

There are two main methods for treating plastic and composite parts – dismantling and recycling of components, and post-shredder recycling. The relative advantages and disadvantages of these methods depend largely on the availability and performance of ELV treatment technologies.

BEMP is therefore to evaluate the pros and cons based on specific information relevant to plastic and composite parts. Front-runner organisations have established closed loop recycling for selected components, and continue to develop new areas to increase the level of recyclability of their vehicles.

Applicability

There is scope for best practice both within the context of pre-shredder and post-shredder recycling pathways.

Associated environmental performance indicators and benchmarks of excellence

Environmental performance indicators	Benchmarks of excellence
(i62) Consideration of LCA studies to determine optimal material routes according to local factors (Y/N) (i63) Share of components treated according to optimal LCA route (%)	-

5. RECOMMENDED SECTOR-SPECIFIC KEY ENVIRONMENTAL PERFORMANCE INDICATORS

The following table lists a selection of key environmental performance indicators for the car manufacturing sector, together with the related benchmarks and reference to the relevant BEMPs. These are a subset of all the indicators mentioned in sections 3 and 4.

#	Recommended Indicator	Common Unit	Main target group	Short description	Recommended minimum level of monitoring	Related EMAS core indicator[20]	Benchmark of excellence	Related Best Environmental management Practice[21]
	CAR MANUFACTURING							
1	Sites with an advanced environmental management system	% of facilities/operations	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Number of sites with an advanced environmental management system (e.g. EMAS registered or ISO 14001 certified and as described in the BEMP) divided by the total number of sites	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	An advanced environmental management system is implemented across all production sites globally	BEMP 3.1.1
2	Number of facilities with detailed energy monitoring systems	# of facilities/operations % of facilities/operations	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Number of facilities with adequate energy monitoring systems. This can be also expressed as a share out of the total number of facilities of the company	Company level	Energy efficiency	Specific energy management plans are implemented across all sites Detailed monitoring per process is implemented on-site	BEMP 3.2.1

20 EMAS core indicators are listed in Annex IV to Regulation (EU) No 1221/2009 (Section C.2)
21 The numbers refer to the sections in this document.

							The plant implements energy management controls, e.g. to switch off areas of the plant during non-productive times for sites with detailed monitoring	
3	Overall energy use per functional unit	kWh/functional unit/year	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Yearly energy (heat, cold and electricity) used in the production site divided by the functional unit selected (e.g. car vehicles manufactured)	Company level	Energy efficiency	-	BEMP 3.2.2
4	Share of production sites assessed for potential and opportunities for use of renewable energy sources	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Production sites assessed for potential and opportunities for use of renewable energy sources divided by the total number of production sites	Company level	Emissions	All production sites are assessed for potential and opportunities for use of renewable energy sources A policy is in place to drive improvement in renewable energy use	BEMP 3.2.3
5	Share of site energy use met by renewable energy	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Amount of renewable energy used (including both energy generated onsite or purchased) divided by the total energy used on site.	Company level	Emissions	Energy use is reported on, declaring the share of fossil and non-fossil energy	BEMP 3.2.3
6	Energy use of lighting equipment	kWh/year	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Annual energy use for lighting measured at facility level	Facility level	Energy efficiency Emissions	-	BEMP 3.2.4

7	Implementation of improved positioning, energy efficient lighting	% of lighting areas within a site % of total sites	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Improved positioning and energy-efficient lighting systems are implemented at the facility	Facility level	Energy efficiency Emissions	The most energy efficient lighting solutions appropriate to specific work place requirements are implemented at all sites	BEMP 3.2.4
8	Implementation of zonal strategies for lighting	% of lighting areas within a site % of total sites	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Management of lighting is implemented on a “zonal” basis, i.e. with lighting switched on or off according to requirements and presence in each area of the facility	Facility level	Energy efficiency Emissions	Zoning schemes are introduced in all sites according to best practice levels	BEMP 3.2.4
9	Electricity use of the compressed air system per unit of volume at the point of end use	kWh/Nm^3 of delivered compressed air, at the specified operating pressure of the compressed air system	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Electricity used per standard cubic meter of compressed air delivered at the point of end-use at a stated pressure level	Facility level	Energy efficiency Emissions	The compressed air system has an energy use of less than 0.11 kWh/Nm^3 for a compressed air system operating at a pressure of approx. 6.5 bars	BEMP 3.2.5
10	Share of electric motors with variable speed drives installed	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Number of motors with variable speed drives installed divided by the total number of motors. Alternatively, this indicator can also be calculated by the electric power of the motors with variable speed drives installed divided by the total electric power of all	Facility level	Energy efficiency Emissions	-	BEMP 3.2.6

				electric motors.				
11	Waste generation per functional unit	kg/ functional unit	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Total waste generated (i.e. hazardous and non-hazardous) divided by the functional units selected (e.g. car vehicles manufactured)	Facility level	Waste	-	BEMP 3.2.7
12	Establishment and implementation of an overarching waste strategy with monitoring and targets for improvements	Y/N	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	A waste management strategy at site level with monitoring and targets for improvements is adopted	Facility level	Waste	Waste management plans introduced [in all sites]	BEMP 3.3.1
13	Waste sent to specific streams, including recycling, energy recovery and landfill	kg/functional unit	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Waste generated is monitored and the different quantities sent for recycling, energy recovery and disposal in landfill are recorded	Facility level	Waste	Zero waste sent to landfill from all production and non-production activities/sites	BEMP 3.3.1
14	Water use per functional unit	L/functional unit	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Total water used at the single facility level divided by the functional units selected (e.g. car vehicles manufactured)	Facility level	Water	Introduction of a water strategy according to a recognised tool, such as the CEO Water Mandate, integrating an assessment of water scarcity Water use on-site is measured per site and per process, optionally using automated software Thresholds for reduction of pollutants in discharged water are set which go beyond	BEMPs 3.4.1, 3.4.2, 3.4.3

							minimum legal requirements	
15	Share of operations in existing sites retrofitted with water-saving devices and processes	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Number of operations in existing sites that are retrofitted with water-saving devices and processes out of the total number of operations	Facility level	Water	All new sites are designed with water-saving sanitary devices and retrofitting of water-saving devices is phased in across all existing sites	BEMP 3.4.2
16	Share of new sites designed with water-saving devices and processes	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Number of new sites designed with water-saving devices and processes out of the total number of new sites	Facility level	Water	All new sites are designed with water-saving sanitary devices and retrofitting of water-saving devices is phased in across all existing sites	BEMP 3.4.2
17	Percentage of total water use met by recycled rain- or wastewater	%	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	Amount of water used in the facility which is water recycled in production processes or rainwater harvested from a rainwater harvesting system	Facility level	Water	Closed loop water recycling is implemented with recovery rate of at least 90%, where feasible 30% of water used are met by harvested rainwater, only in regions with sufficient rainfall	BEMP 3.4.3
18	Application of methodologies to assess ecosystem services to the value chain	Y/N % coverage of value chain	Automotive vehicles, parts and components manufacturers	An assessment of the ecosystem services to the value chain is applied. Additionally, the share of the value chain for which an assessment of the ecosystem services is applied, can be calculated	Company level	Biodiversity	A high-level ecosystem review across the value chain is conducted, followed by a more detailed ecosystem review in identified high risk areas Strategies to mitigate issues in the identified	BEMP 3.5.1

							priority areas of the supply chain are developed, in collaboration with local stakeholders and external experts	
19	Number of projects or collaborations with stakeholders to address biodiversity issues	#	Automotive vehicles, parts and components manufacturers Authorised end-of-life vehicle treatment facilities	The number of different collaboration projects with local stakeholders and experts involved in addressing biodiversity that are in place can be monitored	Facility level	Biodiversity	A comprehensive biodiversity plan is in place to ensure systematic incorporation of biodiversity issues through measurement, monitoring and reporting Cooperation with experts and local stakeholders is in place	BEMP 3.5.2
20	Share of Tier 1 (direct) suppliers that comply with required standards according to internal or external audits	%	Automotive vehicles, parts and components manufacturers	Percentage (by number or by value of products purchased) of Tier 1 (direct) suppliers that comply with required standards according to internal or external audits	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	All major suppliers are required to have an environmental management system in order to qualify for purchasing agreements Environmental criteria are set across all environmental impact areas for purchasing agreements All direct suppliers are sent self-assessment questionnaires and high risk suppliers are audited by third parties Direct supplier development and training	BEMP 3.6.1

							is undertaken Enforcement procedures are defined for non-compliance	
21	Packaging waste generation per functional unit	Kg/ functional unit	Automotive vehicles, parts and components manufacturers	Packaging waste generated divided by the functional units selected (e.g. car vehicles manufactured)	Facility level	Waste	-	BEMP 3.6.2
22	Conducting LCA of the main product lines to support design and development decisions	Y/N	Automotive vehicles, parts and components manufacturers	LCA is carried out on the main product lines to support design and development decisions	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	LCA is conducted for main product lines according to ISO 14040:2006 standards or equivalent	BEMP 3.6.3
23	Improvements in environmental indicators (CO2, energy consumption, pollution, etc.) for new model designs in the main product lines compared to previous model designs	%	Automotive vehicles, parts and components manufacturers	Improvements in environmental indicators (CO2, energy consumption, pollution etc) are set for new model designs in the main product lines compared to previous model designs. This indicator monitors how much different indicators for the product were improved	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	Targets are set to ensure continuous improvements in the environmental impacts of new vehicle designs	BEMP 3.6.3
END-OF-LIFE VEHICLE HANDLING								

24	Rate of specific products or materials recuperated through ELV networks	% (product or material extracted / put on the market)	Authorised end-of-life vehicle treatment facilities	Amount of specific products or materials recuperated through ELV networks divided by the total quantity of materials from ELVs processed	Company level	Waste Material efficiency	Collaboration and partnerships are in place with local/national organisations	BEMP 4.1.1
25	Adoption of a quality management system	Y/N	Authorised end-of-life vehicle treatment facilities	A certified quality management system is in place in the organisation treating end-of-life vehicles	Company level	Waste Material efficiency	A certified quality management system is in place in the organisation	BEMP 4.2.1
26	Installation of a commercial depollution machine or equally performing equipment	Y/N	Authorised end-of-life vehicle treatment facilities	A commercial depollution machine or an equally performing equipment is installed at the facility	Facility level	Total annual generation of waste	-	BEMP 4.2.1
27	Consideration of LCA studies to determine optimal material routes according to local factors	Y/N	ATFs	LCA studies are used to determine optimal materials routes (dismantling and recycling of components vs. post-shredder recycling), according to local factors	Company level	Energy efficiency Material efficiency Water Waste Biodiversity Emissions	-	BEMP 4.2.2