SCCM

stichting coördinatie certificatie managementsystemen voor milieu en gezond en veilig werken

A Circular Economy with ISO 14001

We at SCCM are convinced – and our experience has proven – that any organization, large or small, will achieve better environmental performance by using the 'plan-do-check-act' approach outlined in the ISO 14001 standard.

A Circular Economy with ISO 14001

N190125, version of 18 June 2019

Content

CHAPTER 1

Introduction

Establishing a 'circular economy' is an important objective at both the national and European levels. In 2017, the Dutch government expressed the objective 'A Circular Economy in the Netherlands by 2050'. At the European level, the Circular Economy Package was defined in 2015.

The essence of a circular economy is that products are designed in such a way that the raw materials used can be reused (without, or with as little as possible, loss of properties). Raw materials that cannot be reused must be such that they can be returned to the environment without causing any damage (possibly after incineration).

The latest version of the ISO 14001 standard introduces the concept 'life cycle perspective'. The environmental policy focuses on risks and opportunities that have been identified from a life cycle perspective. Because this assessment must also consider important external developments and the expectations of stakeholders, the link with the circular economy theme is well established.

The purpose of this information sheet is to:

- → demonstrate the meaning of the concept 'life-cycle thinking' and how it can be associated with a circular economy to organisations that have introduced or are in the process of introducing ISO 14001;
- → show ISO 14001-certified organisations that want to do business in a circular way how the various components of the environmental management system can be used;
- → show parties who are confronted with an ISO 14001 certificate what they can expect of an ISO 14001-certified organisation with regard to circular entrepreneurship;
- → provide insight into government policy and the relevant legislation and regulations for the development of a circular economy;
- → provide insight into instruments and tools that organisations can use to make products and services circular.

The establishment of a circular economy involves many different dimensions (see Figure 1, Annex 1). This information sheet discusses only a limited part of these dimensions and focuses only on the correlation with the ISO 14001 standard.

The establishment of a circular economy has consequences for manufacturing companies, traders and distributors, as well as for users of the products (both business and private). The ISO 14001 standard is applied by organisations across a wide variety of industries, both industrial companies and service providers. Each of these organisations can anticipate this development in a different way through the environmental management system. This also applies to service providers. For example, by taking this into account when purchasing products. In this information sheet, a case at an administrative office reveals what the consequences might be for such an organisation.

The motive for pursuing a circular economy and the urgency to do so are discussed in chapter 2. Chapter 3 of this information sheet discusses the relationship between a circular economy and the ISO 14001 standard. For various parts of the ISO 14001 standard it is indicated how each element relates to the realisation of a circular economy and what is the least that can be expected of an ISO 14001-certified organisation. The minimal expectation is that the organisation complies with the legal requirements. Therefore, chapter 4 provides insight into the laws and regulations and the government policy with regard to a circular economy at a national as well as at a European level. Chapter 5 elaborates on the tools that are available online for various subjects, such as the assessment of raw materials, for example. In chapter 6, the relationship between the ISO 14001 standard and the subject of circular economy in practice is demonstrated by means of two cases: one showing the impact for an industrial company and the other for a service provider.

CHAPTER 2

Reason for a circular economy and its urgency

The idea of the importance of circular entrepreneurship is nothing new. For example, the Club of Rome study report and the Brundtland report have already provided an incentive. From the year 2000 onwards, 'cradle to cradle' projects started to emerge, putting circular enterprise into practice. Initially, the main reasons for striving for a circular economy were the availability of raw materials and the environmental taxes on the extraction of raw materials. In recent years, the necessity to reduce CO2 emissions has given this ambition an additional boost.

The realisation of a circular economy requires major adjustments from various parties. It is a far-reaching transition, because there are major consequences for, among other things, the level of the flows of raw material, the production method, and the way in which products are offered and paid for. For example, a circular economy in the chemical industry means switching from fossil to bio-based raw material flows. We also see new technologies emerging to recover raw materials from existing products and to reuse them. this Ts a very complex change, because a large number of chains have to be linked. This is also illustrated graphically in Figure 1 in Annex 1.

The fact that both European and national ambitious targets have now been expressed, relates to a number of developments that highlight the urgency of the realisation of a 'circular economy':

→ **Climate and the environment**
The emission of CO_2 (and other environmentally harmful substances) is reduced when products last longer, components and/or materials are reused, and when fewer raw materials are needed.

→ **Availability of raw materials**
The increasing prosperity and growing world population entails that various essential raw materials are becoming scarce. This makes the ability to reuse already available raw materials extremely important.

→ **Geopolitics**
Europe hardly has any essential raw materials at its disposal. In order to avoid dependency on third parties, it is important that the available raw materials are used optimally.

→ **Economy**
A key condition for maintaining a good economic position at European and national level is to be at the forefront of innovation. The transition to a circular economy provides an opportunity for the development of new products and services that are of great importance for Europe's position.

CHAPTER 3

Circular economy in relation to the ISO 14001 standard

With respect to the correlation between a circular economy and the ISO 14001 standard, a distinction can be made between initiating a policy towards a circular economy and implementing this policy.

The ISO 14001-based environmental management system can both initiate a policy towards a circular economy and be a tool to implement this policy. If initiatives aimed at making products/services circular are already set within the organisation, then the environmental management system can serve as a catalyst to connect these initiatives.

Making an organisation's products and services circular is a far-reaching process that involves a number of changes. Therefore it is best to handle the process in a step-by-step and systematic way. An environmental management system offers all the appropriate elements:

→ **Context analysis (ISO 14001, chapter 4)**
The context analysis reveals the developments that demonstrate whether there is a certain urgency for the organisation in question for a circular economy. For example, there may be legal requirements or developments that make a policy necessary. A manufacturer of plastic packaging material, for example, will have to take action based on government policy with regard to plastics. Stakeholders (such as customers) may also provide an incentive to make products and services circular.

→ **Leadership (ISO 14001, chapter 5)**
Making products and services circular generally entails many changes. Both inside and outside the organisation. It is often required to perform research first in order to map out all the possibilities, which involves several parties. In order to achieve this, the direct involvement of the management is a prerequisite. The management will have to make resources available and convey the importance of circularity. The management must also ensure that the strategic policy of the organisation and the pursuit of circular products or services are in line with each other.

→ **Risks, opportunities and objectives (ISO 14001, chapter 6)**
The first step in making products and services circular is to understand the environmental impact of the raw materials and processes used. ISO 14001 requires this insight to be interpreted from a 'life cycle perspective'. This largely explains where the risks and opportunities lie that need to be addressed. Objectives must be defined in line with the actions that are necessary to achieve them. This is elaborated in section 3.1.

→ **Awareness and communication (ISO 14001, chapter 7)**
Creating products and services circularly often requires the involvement of multiple parties in the chain – both forwards and backwards. Communication is necessary to bring various parties together. When products are made circularly, communication plays an important role in the exchange of information about, among other things, the raw materials that have been used.

→ **Operational planning and control (ISO 14001, chapter 8)**
Making products and services circular starts with the design, followed by the purchase of raw materials and means of production, the execution of own processes, and possible outsourcing. Any transportation issues should also be considered. All these processes must be managed in such a way that the previously defined objectives within the framework of making products and services circular are handled.

→ **Performance evaluation (ISO 14001, chapter 9)**
To enable timely adjustments, the organisation must monitor the progress of the implementation of various actions and the realisation of objectives, and report to the management. During the development phase of the process to make products and services circular, the implementation of the actions aimed at development must be monitored. Once products and services are circular, the attention passes on to their implementation and further improvement.

→ **Continuous improvement (ISO 14001, chapter 10)**
Eventually, making products and services circular step-by-step leads to an improved environmental performance. There will always be room for improvement, on the one hand by increasing the number of products and services offered in a circular way and, on the other, for example, by further increasing the number of cycles for which the raw materials can be re-used.

Annex 2 provides a more detailed description of the relationship with the circular economy for the various sections of the ISO 14001 standard and the minimum that can be expected from an ISO 14001-certified organisation in these areas. In chapter 6, two cases on the application of the circular economy in relation to ISO 14001 are worked out. These cases are examples of an industrial company and a service provider.

3.1 Life cycle perspective in ISO 14001

Unlike the previous versions of the ISO 14001 standard, the latest version (ISO 14001:2015) includes the concept ‘life cycle perspective’. By identifying risks and opportunities on the basis of the life cycle perspective, an organisation obtains points of reference for making the organisation’s activities ‘circular’.

The ISO 14001 standard defines ‘life cycle’ as: *successive and interlinked phases of a product system (or service system from raw material acquisition or generation from natural resources to final disposal. The following remark has been added in the standard: The life cycle stages include acquisition of raw materials, design, production, transportation/delivery, use, end-of-life treatment and final disposal.*

In this regard, the term ‘raw material’ should be interpreted in a broad sense. It includes, for example, the use of water and energy.

ISO 14001 requires that environmental aspects are determined from a life cycle perspective. This means that there must be insight into the potential impact of the raw materials on the environment (both those used by the organisation itself and by producers earlier in the chain).

The potential environmental impacts associated with raw materials may concern:
→ damage to the environment during extraction;
→ depletion of available resources;
→ hazardousness and/or danger to the environment when the raw material is released;
→ environmental impacts linked to the processing/manufacturing of the raw material;
→ environmental impact resulting from the transportation of raw materials;
→ environmental impacts associated with the disposal of products that have been made with/from them.

The environmental management system looks at the raw materials from different perspectives in order to determine the environmental aspects. The life-cycle approach is therefore in line with the ambition of creating a circular economy.

TIP!
Insight into which substances are used in products and their properties is a condition for circular entrepreneurship

A good understanding of the properties of all substances used in the product (or for the service) is essential for making the activities of an organisation circular. This information is important in order to determine, for example, whether:
→ substances that are not desirable or have limited availability (see chapter 4) are used;
→ substances can be replaced by alternatives that are less harmful and/or can be recovered better (with less loss);
→ substances could have a harmful impact when they are incinerated.

ISO 14001 requires that both risks and opportunities with regard to the life cycle perspective are identified. The risks are listed above. The following perspectives can be considered when determining the possible opportunities for improvement that an organisation has from a lifecycle perspective:
→ Changing the production process and/or reducing the products/materials used or replacing them with more environmentally friendly variants (‘rethink’ and ‘redesign’).
→ Minimizing the required additives in the utilisation phase of a product (e.g. making a product more energy efficient).
→ Reusing products/materials with the same functionality or in a subsequent cycle by another user; (‘reuse’).

→ Possibilities for repair so that the product/material lasts longer (‘repair’).
→ Renewing products/materials and re-introducing them to the market (‘refurbishing’).
→ Recovering raw materials from products that are no longer in use and using recovered raw materials (‘recycle’).
→ Generating energy from discarded products/materials (‘recover’).

TIP!
Making products circular becomes easier when using the same (mono) materials as much as possible.

Chapter 5 elaborates on various tools that an organisation can use to gain insight into the environmental effects of the raw materials and/or the processes. 5.4 discusses the importance of quantifying the environmental impacts (by means of an LCA, for example). Quantification makes it possible, for example, to select the products and services with the greatest impact. In many cases, there is more than one solution and the right choice can be made by means of quantification. Quantification is also very important for convincing buyers when choosing a circular product or service.

CHAPTER 4

Circular economy in government policy and laws and regulations

The government can use various tools to realise policy objectives. This can be achieved, for example, by making agreements with parties to voluntarily implement changes (whether or not supported by subsidies, for example). It can also be achieved by deploying legislation and regulations to enforce a certain policy. New developments are often first presented in policy memoranda in which objectives and tools are provided for their implementation.

The context analysis within the ISO 14001 standard (see 4.1 and 4.2) is intended to identify the points from the policy memorandums that are important for environmental policy as well as relevant legislation and regulations that may be important for the implementation of the organisation's environmental policy. The specific requirements that follow from the legislation and regulations are listed in the compliance obligations (6.1.3).

4.1 Government policies relating to circular economy

Both the EU and the Dutch government have set policy principles and objectives with regard to circular economy.

Policy principles in the Netherlands

The programme 'A Circular Economy in the Netherlands by 2050' defines the government's view on circular economy. The objective is to establish a fully circular economy by 2050 at the latest. The government's ambition is to work with social partners to achieve an intermediate target to achieve a 50% reduction of the use of primary raw materials (minerals, fossils and metals) by 2030.

Various follow-up actions have been launched to achieve the objective of 'A Circular Economy in the Netherlands by 2050':

→ A Raw Materials Agreement has been concluded, in which the ambitions are endorsed by more than 400 companies, NGOs, financial institutions, knowledge centres, governments and other organisations.

→ In 2018, transition agendas were drawn up for five high-priority chains:

* biomass and food;
* plastics;
* manufacturing industry;
* construction;
* consumer goods.

→ The transition agendas for the five priority chains have been elaborated in the Circular Economy Implementation Programme 2019-2023. This first implementation programme was published in February 2019 and will be updated annually.
→ In februari 2019, the 'Plastic Pact' was signed by 75 companies and organisations. The companies that have signed this pact have committed themselves to the following objectives:
  * Production for recycling: all plastic packaging and products will be 100% recyclable and, where possible and useful, re-usable.
  * Reduction in use: 20% less use of plastic materials, by making fewer plastic products, by reuse, or by using alternative, more sustainable materials.
  * Recycling: At least 70 percent of all one-way plastic products and packaging that go into the bin are recycled without any loss of quality.
  * Use of recycled materials: companies that manufacture plastic products for single use must include at least 35% recycled material (fossil or bio-based).

ISO 14001-certified organisations active in the five priority chains should have identified government policy in the context analysis (4.1 and 4.2). This could be as an important development or as an expectation of stakeholders. When an organisation has committed itself to the Raw Materials Agreement and/or the Plastic Pact, it has entered into a compliance obligation. Based on ISO 14001 art. 6.1.3, these obligations must be included in the management system.

EU policy on circular economy

The establishment of a circular economy is an important spearhead for the EU. This is reflected in, for example, the following facts:

→ Given that the availability of raw materials is crucial for the economy in the EU, a list of critical raw materials (CRMs) has been published since 2011 (not to be confused with carcinogenic, mutagenic and reprotoxic CMR substances). The first list of 2011 contained 14 CRMs. The most recent list from 2017 contains 27 CRMs. Information about the approach, the importance of the list and the CRMs can be found at https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en. It is important for organisations to be aware of the extent to which raw materials used are 'critical' in terms of availability and possibilities for substitution. In the context of a circular economy, the aim should be to use as few critical substances as possible and, when their use is absolutely necessary, to consider the possibilities for reuse.
→ In December 2015, the European Commission adopted the 'Circular Economy Package' (https://ec.europa.eu/commission/presscorner/detail/en/MEMO_15_6204). The general principles are that the value of products and materials should be preserved as long as possible, that waste and the use of resources should be kept to a minimum, and that raw materials should be kept in the economy at the end of their life, so that they can be reused several times and thus continue to be of value. The package also includes measures that address, among other things, the characteristics of products introduced to the EU market, the responsibilities and liabilities of producers, the method of production, and the end-of-life treatment of a product. Thus, it is a package of measures that is incorporated in both legislation and regulations for various fields (waste in particular) as well as in in incentive programmes.

- → The 'Circular Economy Package' has resulted in 54 actions within the legislative term of the Commission that took office in 2014. Information about the programme and the actions taken can be found at https://ec.europa.eu/environment/circular-economy/index_en.htm.
- → The Commission indicates that a follow-up of the actions taken under the 'Circular Economy Package' is necessary if the EU is to maintain its leading role in the design and production of circular products and services, and to empower consumers to adopt a more sustainable lifestyle. The reflection paper 'Towards a Sustainable Europe by 2030' indicates that in order to allow for maximum circularity in new areas and in new industries, the circular economy should be made the backbone of the EU's industrial strategy. Products should be subject to life cycle assessment by default and the framework for ecodesign should be broadened as much as possible.

4.2 Relevant legislation and regulations for the circular economy

There are no laws or regulations that directly oblige organisations to implement a circular economy. There are, however, laws and regulations that indirectly support the achievement of objectives related to a circular economy. This concerns, for example, legislation and regulations in the following areas:

- → product requirements;
- → waste separation and processing;
- → producer responsibility;
- → chemicals legislation.

Product requirements

Product requirements are increasingly set with the aim of building a circular economy:

- → Regulation of discarded electrical and electronic equipment.
- → The European Ecodesign Directive and the Dutch Regulation on Hazardous Substances in Electrical and Electronic Equipment define requirements for products. The government supervises compliance by checking documents and by, for example, measuring the energy consumption and the content of heavy metals and flame retardants.
- → EU directive establishing a framework for the establishment of ecodesign requirements for energy-related products.
- → Proposal for an EU Directive to reduce the environmental impact of certain plastic products.

Waste separation and processing

The EU Waste Directive, known in the Netherlands as the 'Kaderrichtlijn Afvalstoffen', contains requirements that stimulate the realisation of a circular economy.

The important principles for the Waste Framework Directive include:

- → The introduction of the 'extended producer responsibility' concept, which is one of the means that should help to ensure that the efficient use of raw materials throughout the life cycle of goods, including repair, re-use, dismantling and recycling, is fully taken into account and facilitated in the design and production of goods, without compromising the free movement of goods in the internal market.

→ This directive should steer the EU more towards a 'recycling society', aimed at trying to prevent the generation of waste, and at using waste as a raw material. The Sixth Community Environment Action Programme, in particular, calls for measures aimed at separation at the source, and collection and recycling of priority waste streams. In accordance with that objective, and as a means of facilitating or improving the potential for recovery, where technically, environmentally and economically feasible, waste should be collected separately prior to any recovery operation that produces the best overall environmental result.

In the Netherlands, the Waste Framework Directive has been implemented through the LAP3 (National Waste Management Plan 3, https://lap3.nl, information in Dutch). A draft of the National Waste Management Plan 3 is available in English. A summary in Dutch is available on mijn.sccm.

Producer responsibility (EPR)

The realisation of a circular economy is stimulated by making producers jointly responsible for the processing of discarded products.

The EU Waste Directive defines the principles for Extended Producer Responsibility (EPR). It is the responsibility of the member states to implement the EPR principles in their national legislation by July 2020 at the latest and to ensure that existing schemes for specific products comply with these principles by 2023 at the latest.

In the Netherlands, the producers or importers of:
→ cars;
→ electric and electronic equipment;
→ batteries;
→ car tires; and
→ packaging material (as part of a packaged product)
are responsible for the management of that product in the waste phase. This is included in the principle of producer responsibility.

Producers or importers must therefore set up a collection and processing structure, either individually or collectively. In most cases, the producer or importer is required to write a notification or report about the collection and processing of the product in the waste phase. In addition, the submission of an annual report on the results of the previous year is often required. The Human Environment and Transport Inspectorate evaluates notifications, reports and annual reports.

CHAPTER 5

Tools and information

5.1 Availability of raw materials

One of the reasons for transitioning to a circular economy is to ensure the availability of raw materials. For some raw materials there is already a shortage (e.g. for some metals), for other essential raw materials (e.g. phosphorus) the natural resources are known to be limited/almost depleted.
In addition to the depletion of raw materials, the availability is also influenced by (geo)political conditions and the awareness that the extraction of raw materials can have serious consequences for the environment.

Section 3.1 mentions the EU policy on 'critical raw materials'. Based on this list, the European Commission published a report in 2017, in which the relationship between the list of critical raw materials and the circular economy is elaborated. It is important for organisations to know to what extent the raw materials they use (directly or indirectly) are included in the CRM list.

Late 2015, TNO published a report on raw materials that are critical to the Dutch economy. As a follow-up to this report, the raw materials scanner was launched at the end of 2017. This enables companies in the Netherlands to gain insight into risks with regard to the supply of raw materials. The raw materials scanner is managed by RVO (Netherlands Enterprise Agency). (https://acc.grondstoffenscanner.nl/#/)

5.2 Evaluation of raw materials

Given that alternatives are not readily available for all substances and that the substitution of raw materials is a substantial process that requires setting priorities, it is most practical for organisations to categorise the substances they use. The approach in Schedule 1 can be used as an example.

SCHEDULE 1: CLASSIFICATION OF USED SUBSTANCES AND THE STRATEGY TO BE FOLLOWED

RESULT OF SUBSTANCE ASSESSMENT	ACTION
Acceptable	No action required
Dangerous and/or prohibited	Stop immediately and implement an alternative
Undesirable and an alternative is available	Implement, for example, within one year
Undesirable and an alternative is not yet available	Research alternative solutions

Different sources may be used for the evaluation of the substances used by the organisation:

→ In order to determine whether substances are prohibited, the lists of substances can be used. The REACH legislation, among other things, contributes to this.
→ There are also substances for which the use is not prohibited by law but using them is nevertheless dangerous or undesirable. To determine this, the so-called 'banned lists' with the criteria for admission as a Cradle to Cradle Certified™ product can be consulted.
→ In view of availability, the use of certain raw materials may be undesirable. To determine this, the sources mentioned under 4.1 can be used (CRM list and raw material scanner).

5.3 Reporting – SDGs

In order to visualise the impact of the activities aimed at establishing a circular economy, the consequences can be linked to the Sustainable Development Goals (SDGs) of the United Nations. A total of 17 SDGs have been identified:

1 Put an end to **poverty** everywhere and in all its forms.
2 Stop **hunger,** achieve food security and improved nutrition, and promote sustainable agriculture.
3 Ensure good **health** and promote prosperity for all ages.
4 Ensure equal access to quality **education** and promote lifelong learning for all.
5 Achieve **gender equality** and empowerment for all women and girls.
6 Ensure access to sustainable **water** management and sanitation for all.
7 Ensure access to affordable, reliable, sustainable and modern **energy** for all.
8 Promote continuing, inclusive, and sustainable economic growth, full and productive employment and decent **work** for all.
9 Build resilient **infrastructure**, promote sustainable industrialization and foster innovation
10 Reduce **inequalities** within and between countries.
11 Make cities and human settlements inclusive, secure, resilient and sustainable.
12 Ensure **sustainable consumption** and production models.
13 Take urgent action to combat **climate** change and its impact.
14 Preserve and make sustainable use of the oceans, seas and maritime resources.
15 Protect, restore and promote the sustainable use of ecosystems, manage forests sustainably, prevent desertification and land degradation, reverse it and put an end to the loss of biodiversity.
16 Promote peaceful and inclusive societies in view of sustainable development, ensure access to justice for all, and create effective, accountable and open institutions at all levels.
17 Reinforce the means of implementation and revitalise the global **partnership** for sustainable development.

In relation to actions aimed at establishing a circular economy, a link with SDGs 6 (clean water and sanitation), 7 (affordable and clean energy), 9 (industry, innovation, and infrastructure), 12 (responsible production and consumption), 13 (climate action), 14 (life below water) and 15 (life on land) are the most self-evident. However, there may also be a relationship with other SDGs. For example, if products have to be dismantled for the reuse of raw materials, this can create additional jobs, which contributes to SDG 8 (decent work and economic growth).

Information on the implementation of the SDGs in the Netherlands can be found on the website https://www.sdgnederland.nl/. In English, information can be found at the UN website: https://www.un.org/sustainabledevelopment/.

5.4 Quantification of environmental impacts

The ISO 14001 standard requires the establishment of criteria on the basis of which the environmental impact of the environmental aspects can be compared. The ISO 14001 does not require a detailed life cycle assessment to be carried out. However, the quantification of environmental impacts through the implementation of a complete LCA or the quantification of part of the environmental impacts does have added value.

From various perspectives, it may be important to quantify the environmental impact of (circular) products:
- → Quantification can help to select the first products to be produced in a circular way.
- → Quantification shows which environmental impacts play the most important role in the life cycle and should be given priority in the process of circularisation.
- → When choices have to be made to make a product circular, quantification makes it possible to compare the options.
- → Ultimately, customers will need to be convinced of the benefits of a circular product. This can be tackled by quantifying the environmental impact. This could be the case, for example, for targets included in the SDGs (see 5.3).

Different methodologies are available for the implementation of LCAs (Life Cycle Analysis). These methodologies can also be used to compare circular products. There is, however, an important point of attention in this respect. The existing LCA methods assume the single use of raw materials. This makes the comparison with traditional products difficult. In order to make products circular, it may be necessary to use other raw materials and/or production methods that are less favourable in the case of a single application, but which make it possible, for example, to give products a longer lifespan and to better reuse raw materials. The LCA method should be repeated for the different use cycles of the raw materials.

TIP!
When quantifying the environmental impact, always use generally recognised and public sources and record the calculation so that it is always traceable.

Annex 3 lists various sources that can be used for quantification. The document Usability of Life Cycle Assessment for Cradle to Cradle purposes provides insight into the use of LCAs in the process of making products circular. The document also includes numerous links to background information.

Sources include, for example:

→ https://www.rvo.nl/sites/default/files/bijlagen/Position_paper_Usability_of_Life_Cycle_Assessment_for_Cradle_to_Cradle_purposes_W.pdf
→ https://www.rivm.nl/life-cycle-assessment-lca/downloads (in Dutch with English downloads)
→ https://milieudatabase.nl/ (in Dutch)
→ https://www.ecoinvent.org/database/database.html
→ https://www.co2emissiefactoren.nl/ (in Dutch) or in English: https://english.rvo.nl/sites/default/files/2019/05/The%20Netherlands%20list%20of%20fuels%20version%20January%202019.pdf or https://ghgprotocol.org/calculation-tools

CHAPTER 6

Cases with respect to circular economy in relation to ISO 14001

In this chapter a production company and a service provider develop a case study to elaborate on how the subject of circular economics is reflected in the environmental management system on the basis of ISO 14001.

6.1 SKOGA, producer of plastic foil packaging

Company description SKOGA

SKOGA B.V. produces a range of high-quality barrier shrink packaging (foils and artificial casings) on a basis of polyvinylidene chloride (PVDC), specially designed for fresh meat and meat products, cheese, fish, poultry, game, and pizza. The strength of shrink packaging lies in its perforation resistance in minimum thicknesses and its high gloss and clarity. With this type of food packaging, the shelf life of the packaged product is extended and, as a result, spoilage is postponed.

The shrink packages are produced by means of extrusion. The extrusion process uses thermoplastic (granules/compounds). By using advanced technical polymers, SKOGA is able to extrude high barrier shrink film for various end-user applications. The extrusion facilities are active 24 hours a day, seven days a week, all year round. In the conversion department, the extruded semi-finished products are converted into bags and artificial casings by using cutting, unfolding or roll-up equipment.

At the customer's request, shrink packaging can be supplied in any desired colour and can be printed using flexo printing. Flexo printing uses flexible printing plates made of rubber or plastic, which are often used for printing on packaging.
SKOGA has its own technical service department which includes a workshop. In the workshop, various operations (sawing, turning, drilling, grinding, milling, welding) are carried out for the maintenance of the machines and installations. Cooling and cutting fluids are used for machining operations.

SKOGA B.V. is one of the larger players in the shrink packaging market. The company has branches in Germany, Finland, and France. It employs 400 workers, of whom 270 are in Uitgeest in the Netherlands. There are also affiliated companies in Canada, Brazil, and China.

However, SKOGA B.V. has recently been shocked by the European Commission's proposal for a ban on, among other things, plastic packaging. Compared to its competitors, SKOGA is lagging far behind in the field of bio-based shrink packaging.

Important environmental aspects at SKOGA B.V. include:

Soil pollution
As a result of the storage and use of soil contaminants (solvents, inks, lubricating and system fluids, etc.).

Air pollution
→ VOC emissions: due to the flexo printing process (this installation includes flexo printing, drying and cleaning of process equipment in a washing machine).
→ Dust emission: The extrusion process uses thermoplastic materials (granules/compounds). In places where fine-grained raw materials are weighed, mixed and/or processed, dust may be released.

External safety
There are safety risks within the facility, in particular due to the storage of gas cylinders, the storage of environmentally hazardous substances in packaging and the storage of solvents (n-propyl acetate) in above-ground tanks (2 x 10 m^3).

Energieverbruik
Electricity and natural gas are consumed within the facility. The annual electricity consumption is 9,750,000 kWh and the annual natural gas consumption is 855,000 m^3. SKOGA BV has joined the Dutch multi-year agreement (MJA-III) for the rubber and plastics industry.

Water consumption
The annual water consumption amounts to approximately 152,000 m^3, of which 450 m^3 of water is used for sanitary purposes and 151,550 m^3 for cooling water. SKOGA has barely carried out any research into possible water-saving measures and no water-saving measures have yet been implemented.

Waste
The company produces approximately 821 tons of industrial waste and approximately 12 tons of hazardous waste each year. About 750 tons of the industrial waste consists of plastic waste resulting from production. 300 tons (clean plastic waste) are reused externally. This also means that a considerable amount of plastic waste (450 tons) is not reused externally. SKOGA has not yet carried out any research in the field of waste prevention.

Water pollution
The industrial waste water consists of process water and cooling water that does not contain any significant pollution (mainly salts used for water softening) and its temperature is below 30°C. The quantities involved, however, are significant.

Shrink packaging in the waste phase
The shrink film ultimately ends up in the consumer's waste container.

Case Circular Economy in relation to ISO 14001 at SKOGA B.V.

The context analysis could reveal the subject of the circular economy in different ways. It could be identified as an issue on the basis of, for example:

→ government policy (circular economy in the Netherlands by 2050 / Raw materials agreement / Transition agendas for five economic sectors);
→ development of prices and/or availability of raw materials;
→ increased use of 'Extended Producer Responsibility' by the government.

In addition, there may be stakeholders who have linked the needs and/or expectations to the circular economy:

→ buyers;
→ suppliers;
→ branch organisation;
→ waste service providers.

	QUESTIONS CIRCULAR ECONOMY IN RELATION TO ISO 14001 AT SKOGA B.V.	ANSWERS FOR SITUATION AT SKOGA B.V.
a	WWhen you consider the following options related to the life cycle perspective of a product/material: 1 Reducing the number of products/materials used or replacing them with more environmentally friendly alternatives. 2 Minimizing the necessary additives (such as energy) in the use phase. 3 Reusing products/materials with the same type of application (possibly by another user). 4 Making repairs to increase the life span of the product/material. 5 Renewing products/materials and relaunching them on the market. 6 Recovering raw materials/using recovered raw materials. 7 Generating energy from discarded products/materials. Indicate which options may apply to SKOGA and give an example for each option.	The following options may apply to SKOGA: 1 Making film with less material (thinner), using plastics made from renewable sources, biodegradable materials. 2 Developing film in such a way that less energy is needed when using it (e.g. sealing). 3 N/A 4 N/A 5 N/A 6 Choosing plastics suitable for recovery after collection + good information on the packaging which encourages users to separate waste properly. In addition to the modifications related to the product/material, improvements are possible in the production process, aimed at, for example, reducing the consumption of water, energy, and production waste. 7 No own energy generation, but providing materials that do not release hazardous substances during incineration.
b	During the ISO 14001 audit at SKOGA, the context analysis did not reveal any issues related to life cycle perspective/circular economics. What is the course of action during the audit? Could you say that this entails that the context analysis was carried out insufficiently? What is the motivation for this? Does this mean that a deviation is/is not recorded for this?	The audit examines which approach is used for the identification of issues. Which issues have been identified? Which environmental aspects have been identified? In this case it can be expected that SKOGA has established that the use of plastic packaging is under discussion and that the type of plastics used is critical from an environmental point of view. When issues such as those mentioned in question 1 a (e.g. concerning raw materials) are not mentioned in the context analysis but do emerge as an environmental aspect, a remark can be made with regard to the implementation of standard 4.1. 'Understanding the organization and its context'. If the environmental aspects of the raw materials used are not considered in the identification of environmental aspects, there is sufficient reason to record a deviation with regard to the execution of the context analysis. If necessary, a deviation with standard 6.1.2 'Environmental aspects' could also be recorded. The choice depends on the way in which the context analysis is further carried out.

c	The environmental policy (5.2) should 'provide a framework for setting environmental objectives'. Do you think that the SKOGA's policy with respect to a subject such as circular economy/raw materials policy should be reflected in the environmental policy, and what is the motivation for this? Give an example of a formulation that offers a 'framework'.	If the context analysis reveals that the circular economy and/or raw materials policy are important issues, then you can expect the policy to address them. The policy should contain something that gives direction to choices regarding products/raw materials. The choice of raw materials and the products that are made, as well as the production method, determine the environmental performance. When, for example, the policy only states that 'environmental performance will be continuously improved', this cannot be referred to as a 'framework' for objectives, as requested in standard article 5.2 'Environmental policy'. A framework must be more concrete, because otherwise it will not help to set priorities and concrete objectives. An example of a phrase from environmental policy could be: SKOGA aims to use raw materials from renewable sources or products that are recyclable.
d	Assuming that SKOGA has laid down in its environmental policy that it wants to contribute to the creation of a circular economy, do you think that there should also be important environmental aspects related to the products/raw materials used? If so, why or why not?	Yes, there can/will be multiple environmental aspects related to the used or purchased products/raw materials. The extent to which these are important depends on the criteria used. Frequently used criteria are the impact on the environment, the risk, the importance that stakeholders attach to this, and the possible influence of the organisation on the management and limitation of the (chain) aspect. It may be expected that there are significant environmental aspects within SKOGA relating to the products/raw materials used.
e	Assuming that SKOGA has expressed an ambition in its environmental policy with regard to circular entrepreneurship and/or the use of raw materials, do you think that SKOGA should also define objectives? If so, give an example.	Yes, if ambitions have been expressed, these will have to be further developed by means of targets and it will have to be indicated how and within what timeframe this ambition is intended to be achieved. These targets could be, for example: - to be able to offer products based on bio-based raw materials by 2020; - 100% reuse of production waste by 2019; - reducing water consumption by 20% by 2020.
f	Assuming that SKOGA's objective is to find an alternative for product/material Y in order to greatly improve the possibilities for recycling, to enable this, a pilot was started four years ago to test alternatives. Due to personnel turnover, things did not go as smoothly as expected and hardly any progress was made in four years. This has already been observed in previous audits and comments have been made on two occasions. Now, there is a reassessment and the management are presenting a similar story. What do you include in the audit report?	A further investigation will be carried out first. Is this the only issue that has not been addressed, or does this also apply to other issues? If it can be concluded that this is not the only thing that did not go well, then a major deviation category A / will be drawn up. This can be based on different standard articles: Standard article 5.1 'Leadership and ensuring that the necessary resources are available' is the most obvious. The management has not made available the necessary resources to carry out planned actions. Possibly standard article 9.3 'Management review'. The management has not sufficiently reviewed the progress of planned actions, nor has it taken actions to ensure continuous effectiveness of the management system. 6.2.2 could also be used (actions to plan the achievement of environmental objectives), actions are incorrectly planned.
g	In order to be able to determine the environmental aspects from a 'life cycle perspective', SKOGA needs information relating to the disposal of the products. What information should the SKOGA have available with regard to the disposal in order to be able to determine the environmental aspects and/or to plan actions?	The following information is relevant to SKOGA in this context: - The experiences of plastic recycling companies with the raw materials used in recycling and/or requirements for plastics in relation to the improvement of the recyclability. - The behaviour of the consumer with regard to whether or not to separate plastic waste. Which factors can improve the separation?

6.2 ADCOUNT, Accountant-Administration Office

ADCOUNT B.V. provides administrative and accounting services for medium-sized organisations. ADCOUNT has four locations and operates in the north and east of the Netherlands.

Approximately 300 employees are divided equally between the four locations. Two offices are owned, and two offices are rented. ADCOUNT has a small automation department that is responsible for the management and maintenance of the hardware and software. All hardware is owned by ADCOUNT, as is the inventory.

About 100 of the approximately 300 employees often work at the customers' locations, so they have a leased car.

ADCOUNT's environmental policy statement is short but powerful:
→ *ADCOUNT strives to provide services that respect the environment and comply with applicable laws and regulations.*

Case Circular economics in relation to ISO 14001 at ADCOUNT
HADCOUNT's context analysis could reveal the subject of the circular economy in different ways. It could be identified as an issue on the basis of, for example:
→ government policy (circular economy in the Netherlands by 2050 / Raw materials agreement / Transition agendas for five economic sectors);
→ development of prices and/or availability of raw materials;
→ increased use of 'Extended Producer Responsibility' by the government.

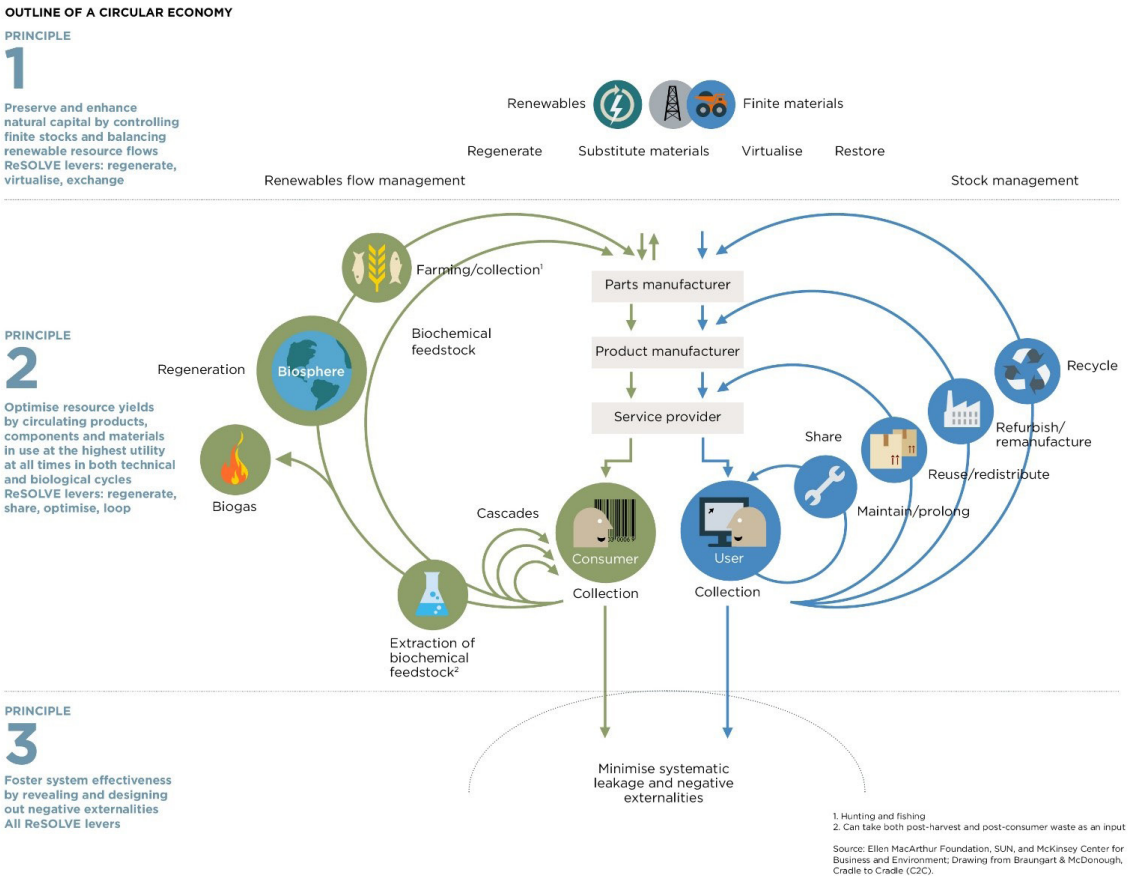
In addition, there may be stakeholders who have linked the needs and/or expectations to the circular economy:
→ buyers;
→ suppliers;
→ branch organisation;
→ waste service providers.
→ afvaldienstverleners.

	QUESTIONS CIRCULAR ECONOMICS IN RELATION TO ISO 14001 AT ADCOUNT	ANSWERS FOR SITUATION AT ADCOUNT
a	When you consider the following options related to the life cycle perspective of a product/material: 1 Reducing the number of products/materials used or replacing them with more environmentally friendly alternatives. 2 Minimizing the necessary additives (such as energy) in the use phase. 3 Reusing products/materials with the same type of application (possibly by another user). 4 Making repairs to increase the life span of the product/material. 5 Renewing products/materials and relaunching them on the market. 6 Recovering raw materials/using recovered raw materials. 7 Generating energy from discarded products/materials. Indicate which options may apply to ADCOUNT and give an example for each option.	A distinction can be made between the services offered by ADCOUNT and the products purchased to provide the services. For the services themselves, option 1) applies: by optimising the efficiency of the service process, less personnel may be required, which leads to less transport/maybe more personnel could be able to work remotely. For purchased goods, there are several options: 1 Computer equipment (e.g. Choose with longer use in mind / no longer owned, back to supplier), choice of furniture, choice of lease cars. 2 Energy consumption building/equipment/cars. 3 Advance determination of what will happen to purchased products (such as computers, furniture, etc.) when they are no longer needed. 4 Longer use of products, for example by repairing or upgrading them. 5 You can choose to pay for the use of equipment instead of purchasing it.
b	During the ISO 14001 audit at ADCOUNT, the context analysis did not reveal any issues related to life cycle perspective/circular economics. What is the course of action during the audit? Could you say that this entails that the context analysis was carried out insufficiently? What is the motivation for this? Does this mean that a deviation is/is not recorded for this?	The audit examines which approach has been used for identifying issues. Which issues have been identified? Which environmental aspects have been identified? In this case, it can be expected that ADCOUNT has established that the circular economy is an important policy theme. If subjects such as those mentioned in question 1a (e.g. concerning purchasing) are not mentioned in the context analysis but do emerge as an environmental aspect, then a remark can be made with regard to the implementation of standard 4.1 'Insight into the organisation and its context'. If no attention is paid to the environmental aspects of the purchased products at the time of identifying environmental aspects, there is enough reason to note a deviation from the performance of the context analysis. If necessary, a deviation from standard 6.1.2 'Environmental aspects' could also be written. The choice depends on the way in which the rest of the context analysis is carried out.
c	The environmental policy (5.2) should 'provide a framework for setting environmental objectives'. Do you think that the ADCOUNT's policy with respect to a subject such as circular economy/raw materials policy should be reflected in the environmental policy, and what is the motivation for this? Give an example of a formulation that offers a 'framework'.	ADCOUNT's environmental performance is largely linked to purchased products/services. This should be reflected in the environmental policy. The 'environmental policy statement' as included in the case description does not provide sufficient framework, for which a deviation from Cat B should be reported. Example: ADCOUNT wants to contribute to a better environment by allowing the environmental impact to play a role in the purchase of products and services.

d	Assuming that ADCOUNT has laid down in its environmental policy that it wants to contribute to the creation of a circular economy, do you think that there should also be important environmental aspects related to the products/raw materials used? If so, why or why not?	Yes, there are/will be several environmental aspects related to the used or purchased products/raw materials. The extent to which these are important depends on the criteria. Frequently used criteria are: the impact on the environment, the risk, the importance stakeholders attach to this and the possible influence of the organisation on the management and limitation of the (chain) aspect. ADCOUNT may be expected to have significant environmental aspects related to purchased (or leased) products.
e	Assuming that ADCOUNT has expressed an ambition in its environmental policy with regard to circular entrepreneurship and/or use of raw materials. Do you think that ADCOUNT should also define objectives? If so, give an example.	Yes. - Purchase of computer hardware aimed at use for at least 5 years and agreements on take-back to be made in advance. - New lease cars based on electricity: 30% in 2019 and 50% in 2020.
f	Assuming that ADCOUNT's objective is to find an alternative for product/material Y in order to greatly improve the possibilities for recycling, to enable this, a pilot was started four years ago to test alternatives. Due to personnel turnover, things did not go as smoothly as expected and hardly any progress was made in four years. This has already been observed in previous audits and comments have been made on two occasions. Now, there is a reassessment and the management are presenting a similar story. What do you include in the audit report?	None. It is safe to assume that a waste collector will adequately dispose of it and ensure the separation of the waste streams.

ANNEX I

Circular Economy displayed by Ellen McArthur Foundation



Annex 2

Circular Economy in relation to the requirements in the ISO 14001 standard

The ISO 14001 standard requires that the life cycle perspective is taken as a starting point for the determination of the environmental aspects. The ISO 14001 consists of a coherent number of requirements for the systematic development and execution of an environmental policy. In the following overview, the relation of these standard requirements to the subject of circular enterprise is elaborated. A selection has been made of the standard requirements for which this relationship is the closest. If circular entrepreneurship is the basis of a company's strategy, this will be reflected in all parts of the environmental management system.

PAR. NO.	REQUIREMENT FROM ISO 14001	CONNECTION WITH CIRCULAR ENTREPRENEURSHIP	WHAT IS THE MINIMUM THAT CAN BE EXPECTED OF AN ORGANISATION WITH ISO 14001
4.1	Identification of important points that influence the intended result of the environmental management system	Important points/developments in the field can be a reason to pay attention to circular entrepreneurship: - future shortage of current raw materials; - future laws and regulations regarding the use of raw materials and/or certain products; - availability of other raw materials and/or production technologies; - government policy; and - new products/services of colleagues/ competitors.	The minimum that can be expected is that the subject of 'circular entrepreneurship' has been identified as an important development for environmental policy. This certainly applies to organisations operating in the five priority industries (see 3.1): - biomass and food; - plastics; - manufacturing industry; - construction industry; and - consumer goods. Depending on the industry, more specific points can be expected (see examples in chapter 6).
4.2	eeds and expectations of stakeholders	Different stakeholders may have expectations that are related to circular entrepreneurship: - Customers want products that, for example, last longer, can be repaired, can be taken back. - Governments have policies and legislation focused on, for example, waste, raw materials, and circular economy. - Suppliers/service providers: suppliers offer circular products, waste companies set requirements for separation. - Personnel: people want to work for an organisation that is progressive and embraces sustainability. - Shareholders/investors increasingly expect active sustainability policies.	Knowledge of the laws and regulations or policy objectives of the government, which are related to circular enterprise (see also chapter 3).

5.1	Leadership with regard to establishing an environmental policy and objectives, and compatibility with the strategic direction	For many organisations, circular entrepreneurship means innovation of products, used materials, production methods, and sales. The direct involvement of leadership is a precondition to achieve this. Circular entrepreneurship can therefore not be viewed separately from the strategic direction of the organisation. If the decision to implement circular entrepreneurship arises from the environmental policy, this will also have to be reflected in the strategic policy and vice versa.	For organisations where circular economy emerges as an item from the context analysis, the management should be aware that this is the case and should have a clear view on the way in which this is or is not addressed and how it fits within the strategic policy of the organisation.
5.2	Environmental policy	Environmental policy should 'provide a framework for establishing environmental objectives'. If an organisation intends to implement circular entrepreneurship, this should also be reflected in its environmental policy, because this is the basis for determining priorities and objectives. The starting point for circular entrepreneurship can be reflected in environmental policy in various ways. By incorporating the ambition of circular entrepreneurship, for example, or by naming parts of it such as the ambition to use renewable raw materials, etc.	If an organisation has included circular entrepreneurship in its strategy, this should also be reflected in its environmental policy (as indicated in the left column, this can be done in various ways). If an organisation has no actions related to circular entrepreneurship, it will not be reflected in its environmental policy either.
6.1.2	Determining environmental aspects from a life-cycle perspective	This requirement from the ISO 14001 standard provides insight into both the risks and opportunities of an organisation in relation to circular entrepreneurship. The life cycle perspective requires that there is insight into the effects on the environment, both with regard to the suppliers and for the use and waste phases. The life cycle perspective must also be considered for service providers. For example, by considering the way in which the service is carried out, the resources and the effects of the service such as the effect of advice that is given.	Insight into the characteristics of the raw materials used and the consequences/possibilities for influencing the environmental effects in the various phases: - design; - production; - transport; - use; - end of use.
6.1.3	Compliance obligations	Compliance obligations may arise from laws and regulations from both the Netherlands and the EU and agreements with, for example, customers or possibly the industry. Agreements that have been entered into voluntarily (e.g. by signing the Raw Materials Agreement or the Plastic Pact - see 3.1) should also be included.	Follow the overview of requirements arising from laws and regulations and other obligations.

6.1.4	Planning actions	The context analysis (4.1 and 4.2) and the identification of environmental aspects provide insight into the risks and opportunities. This includes the risks and opportunities related to the circular economy. The organisation must plan actions to address these. Sometimes, an organisation will have to set priorities. The principles are determined in the environmental policy. This raises the question of the size of the risk and/or the chance of improvements related to the circular economy. In any case, actions should be planned to address risks and opportunities that arise from compliance obligations.	An organisation must plan actions for all risks and opportunities that have been identified. This includes the risks and opportunities related to circular economy. Priority is given to risks and opportunities that are subject to compliance obligations. Priorities can be set for other risks and opportunities on the basis of financial, technical or operational circumstances. An organisation must be able to motivate the choices it has made.
6.2.1 and 6.2.2	Planning environmental objectives and actions to achieve environmental objectives	The risks and opportunities that will be addressed are determined on the basis of 6.1.4. Environmental objectives are necessary in order to determine concrete actions. Objectives aimed at the circular economy may include, for example, the replacement of certain raw materials and the take-back of products in x years, etc. Actions (who, what, how, when) must subsequently be planned to achieve the objectives.	When the need to address certain risks and opportunities related to the circular economy have been established (see 6.1.4), objectives and actions must also be formulated for their implementation.
7.4	Communication	The execution of actions to address risks and opportunities related to circular economy often result in substantial changes for the organisation itself and for suppliers and customers. Therefore, communication (both internal and external) plays an important role: on the one hand, to involve parties both inside and outside the organisation in the necessary changes. On the other hand, communication is also required to gather practical information such as the composition of raw materials and the conditions for reuse. The ISO 14001 standard requires that processes are established and implemented to ensure that the necessary communication is also carried out systematically.	In the case of risks and opportunities related to circular economy, the necessary internal and external communication will have to be considered during the execution of the actions. This should be carried out in accordance with the available processes.
8.1 a)	Control measures related to the design and development process from a life-cycle perspective	In the design and development phase of products and services, crucial choices are made for making products/services circular. To ensure that the identified risks and opportunities (from 6.1.2) and objectives (from 6.2.1) are achieved, the organisation must implement control measures (such as design objectives, training of personnel, information on raw materials and other materials, internal checks).	Where the environmental aspects (2.1.4) identify risks and opportunities that can be influenced by the design of the product or service, it is necessary to ensure that control measures are implemented in such a way that the objectives are achieved.

8.1 b) and 8.1 c)	Determining environmental requirement(s) for the purchase of products and services from a life-cycle perspective. Communication with external suppliers from a life-cycle perspective	Information about the purchased products is crucial for circular entrepreneurship. These can be both be products/services that serve as raw materials/ semi-finished products and products/ services that are used during the process (e.g. computers, furniture, transport, cleaning). This includes information about the composition, lifespan and recyclability of the product itself as well as about the environmental aspects associated with production and transport. Based on this information, it becomes clear what requirements should be imposed on the purchased products and services. These requirements must be communicated to the supplier.	The organisation must set requirements for purchased products/services when there are risks and opportunities related to circular economy.
8.1 d)	Providing information about the environmental aspects of transport, use and disposal	In a circular economy, the provision of information plays an important role. For example, the properties of the raw materials the organisation uses are crucial for their reuse. Based on 8.1(d), an organisation should consider whether it is relevant to provide information and what information is involved.	An organisation must consider potential significant environmental aspects in the phases of use and disposal. If there are risks and opportunities related to circular economy, and the organisation also introduces products to the market, this will be necessary.
9.3	Management assessment	The management periodically assesses changes in the context analysis and the progress of the organisation's own performance. This includes all developments related to the circular economy. The management must make decisions with regard to the opportunities for continuous improvement. This also includes actions related to the circular economy.	Any new developments or requirements related to circular economy should be assessed by the management. This may be an incentive to fine-tune or, where they do not already exist, to include circular economic policy and objectives. The management also assesses the progress of the planned actions and takes follow-up measures in response.
10	Improvement	The performance evaluation (information from monitoring, internal audits, and the management assessment) provides insight into opportunities for improvement. These can also be deviations that require (corrective) measures. When actions are planned to address risks and opportunities related to circular entrepreneurship and implementation is lagging, the cause must be investigated and addressed.	ISO 14001 requires that an organisation is committed to the continuous improvement of its environmental performance. For many ISO 14001-certified organisations, the circular economy and the handling of raw materials will be a subject that offers risks and/or opportunities. An ISO 14001-certified organisation will have to be able to answer the question of how the organisation responds to this.

Annex 3

Links and literature

Literature and reports on circular economy

- → Michael Braungart and Bill McDonough; Cradle to Cradle; 2002, translated into Dutch in 2007
- → Mariana Mazzucato; The Value of Everything; 2018
- → Kate Raworth; Doughnut Economics; 2017
- → Thomas Rau, Sabine Iberhuber; Material Matters; 2016
- → Braungart, McDonough; The Upcycle; 2013
- → Ad Lansink; Challenging Changes; 2017
- → Ad Lansink; De Kracht van de Kringloop; 2010
- → Ellen McArthur Foundation; multiple publications; https://www.ellenmacarthurfoundation.org/publications
- → Jan Jonker and others; Organising for the Circular Economy; 2018
- → Material Economics; The Circular Economy, A powerful force for climate mitigation; 2018
- → European Environment Agency: Integrating economy and bioeconomy would improve sustainability in Europe; 2018
- → ABNAMRO; The Value of All Things, Circularity across the industries; 2018
- → Arjan de Koning and Esther van der Voet; Institute for Environmetal Sciences (CML); Expected demand for resources in the Netherlands; 2018
- → PBL Netherlands Environmental Assessment Agency; Circular Economy, what we want to know and what we can measure; 2018
- → PBL Netherlands Environmental Assessment Agency (Eric Drissen and Herman Vollebergh); Can the circular economy contribute to the energy transition?; 2018
- → World Economic Forum; https://www.weforum.org/projects/circular-economy

Government policy

- → Ministry of Infrastructure and Water Management and Ministry of Economic Affairs and Climate Policy; A Circular Economy in the Netherlands by 2050; 2016
- → European Commission; https://ec.europa.eu/environment/circular-economy/index_en.htm

Sustainable Development Goals (SDGs)

- → https://www.sdgnederland.nl/ or https://www.un.org/sustainabledevelopment/
- → https://unric.org/nl/duurzame-ontwikkelingsdoelstellingen/sdg-1/ (in Dutch)
- → https://www.sdgnederland.nl/nieuws/sdgs-implementeren-moet-je-leren-voor-bedrijven/ (in Dutch)
- → https://www.duurzaambedrijfsleven.nl/industrie/29659/hoe-kan-het-bedrijfsleven-echt-werk-maken-van-sdgs (in Dutch)
- → https://www.vno-ncw.nl/content/de-bedrijfspraktijk-sustainable-development-goals-sdgs (in Dutch)
- → https://www.duurzaambedrijfsleven.nl/industrie/30007/sdgs-bedrijfsstrategie (in Dutch)

Life Cycle Analysis (LCA)

→ https://www.rvo.nl/sites/default/files/bijlagen/Position_paper_Usability_of_Life_Cycle_Assessment_for_Cradle_to_Cradle_purposes_W.pdf

→ https://www.rivm.nl/life-cycle-assessment-lca/downloads (Dutch with English downloads)

→ https://milieudatabase.nl/ (in Dutch)

→ https://www.ecoinvent.org/database/database.html

→ https://www.co2emissiefactoren.nl/ (in Dutch) or in English: https://english.rvo.nl/sites/default/files/2019/05/The%20Netherlands%20list%20of%20fuels%20version%20January%202019.pdf or https://ghgprotocol.org/calculation-tools

→ https://ec.europa.eu/environment/eussd/smgp/ef_pilots.htm

Normontwikkeling

→ NEN; https://www.nen.nl/Circulaire-economie.htm (in Dutch)

Contact

Please do not hesitate to contact us if you have any questions. We will gladly help companies, organizations, consultants, supervisory bodies, certification bodies and other stakeholders.

Mijn.sccm is *the* knowledge platform for ISO 14001 and ISO 45001/OHSAS 18001. On mijn.sccm, you'll find a wealth of information including summaries of the most relevant (Dutch) environmental and OHS legislation and regulations, and semi-annual overviews of updates to legislation and regulations (all summaries in Dutch). Click on mijn.sccm.nl and sign up!

SCCM
PO Box 13507
2501 EM The Hague
The Netherlands
T 070 - 362 39 81
info@sccm.nl
www.sccm.nl

Publication SCCM, The Hague, version of 18 June 2019