Circular economy

May 2025

iso.org

ISO, an independent and non-governmental organization

Since 1946

ISO's consensus-based standards development process **ensures that comments from all stakeholders are taken into account.**

170+
Members

There is only one member per country.

800+
Technical committees

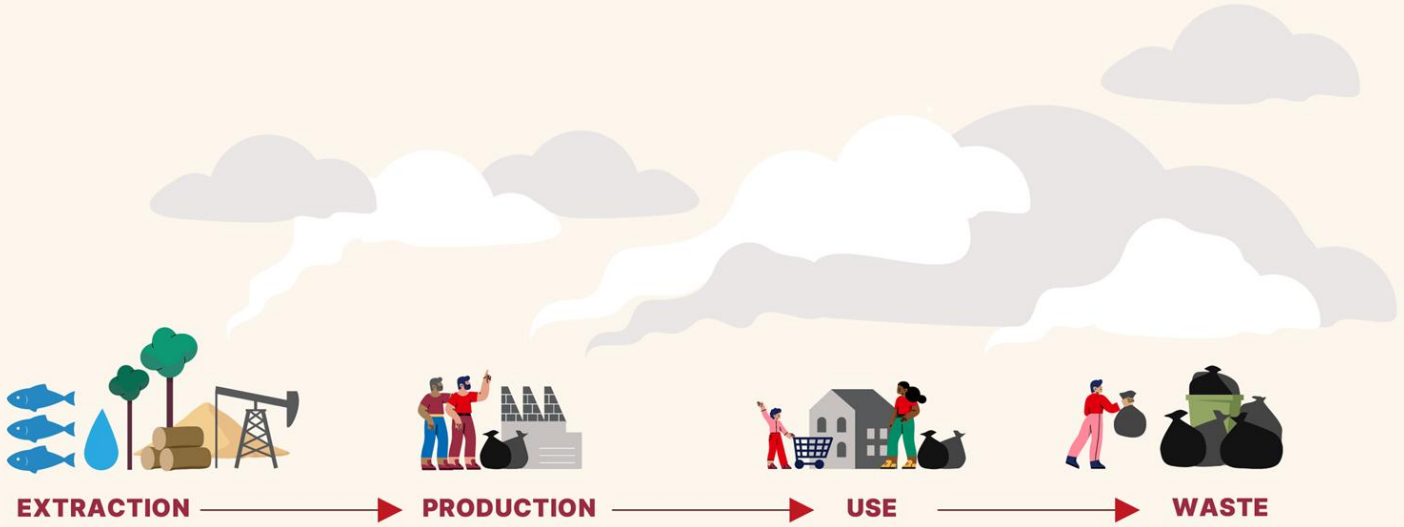
25 000+
International standards

The ISO way

Inclusive
Value-driven
Independent
Can-do
Global

The global economy is linear

This linear economy leads to resource depletion, biodiversity loss, waste and harmful losses and releases, **which collectively are causing serious damage to the capacity of the planet to continue to provide for the needs of future generations.**



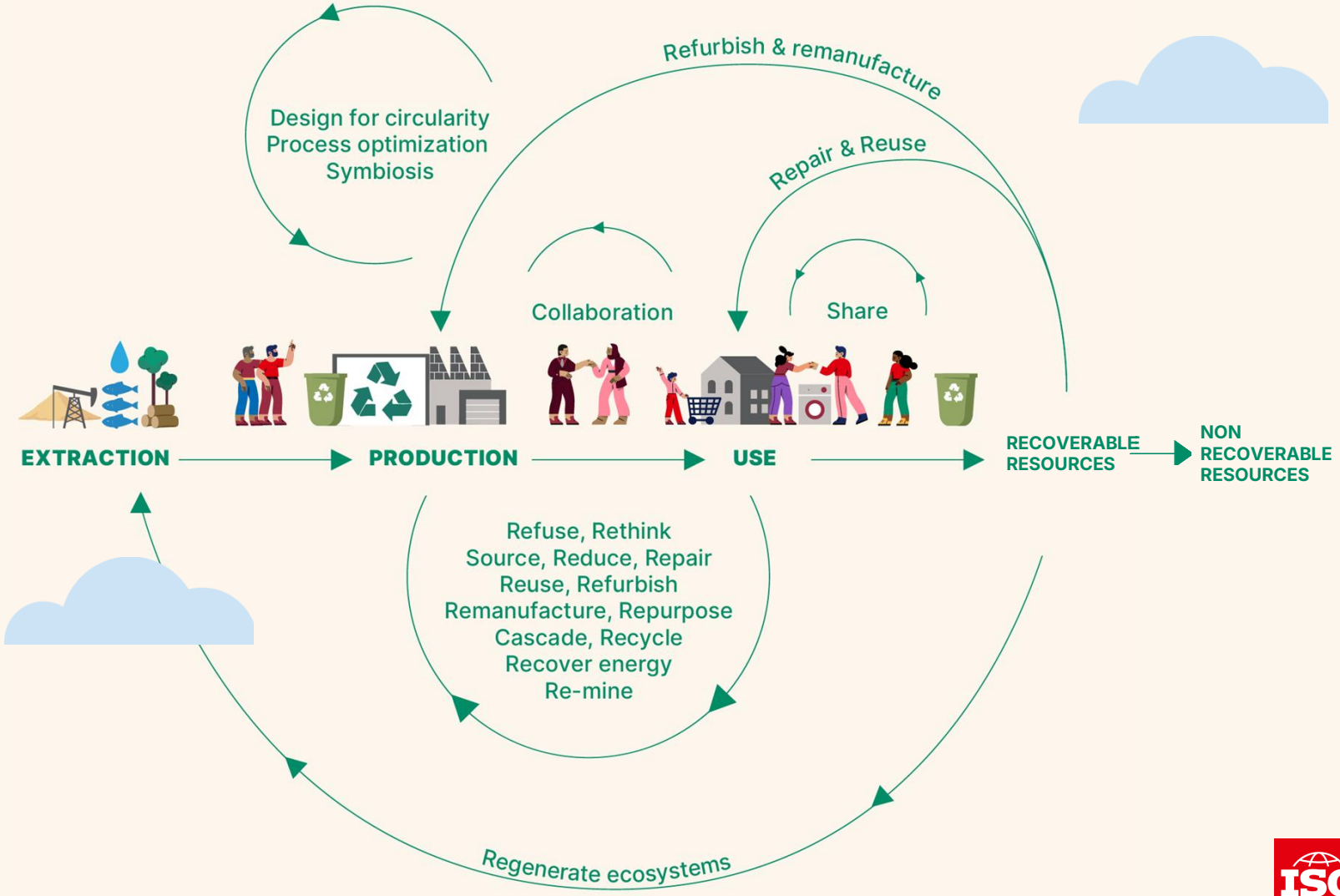
Several planetary boundaries have already been reached or exceeded:

- ☑ Climate change,
- ☑ Biosphere integrity,
- ☑ Novel entities,
- ☑ Land-system change,
- ☑ Freshwater change,
- ☑ Biogeochemical flows nitrogen and phosphorus.

Towards a circular economy

Transition towards an economy that is more circular, **based on a circular use of resources, can contribute to meeting current and future human needs.**

This transition calls into question our modes of production and consumption.
It can also contribute to the creation and sharing of more value within society and interested parties, while natural resources are managed to be replenished and renewed, securing the quality and resilience of ecosystems.



Circular economy by ISO

103 countries and 19 international organizations bring together experts to develop circular economy standards.

SUSTAINABLE DEVELOPMENT GOALS

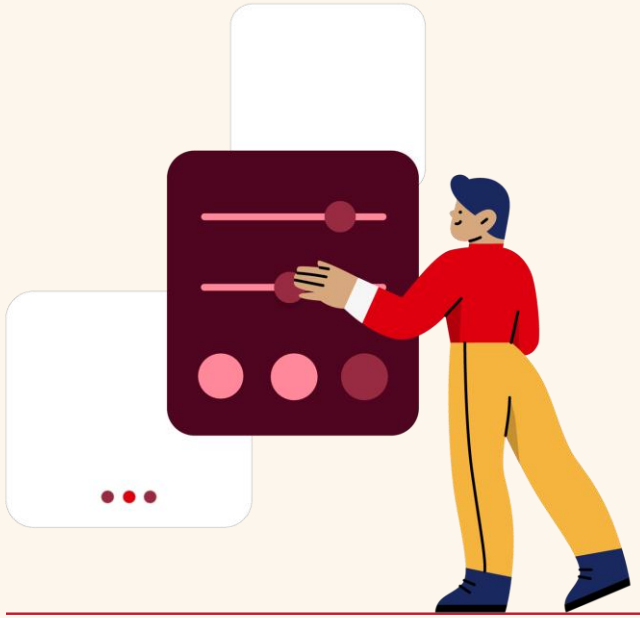
Standards contribute to achieve SDGs

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

International answers for the circular economy transition

ISO 59000 family of standards

A common understanding:
Definitions, principles, actions, business models, value networks, measures, assessment, ..., all what is needed to act now!



ISO 59004

Circular economy
Vocabulary, principles and guidance for implementation

May 2024

ISO 59010

Circular economy
Guidance on the transition of business models and value networks

May 2024

ISO 59020

Circular economy
Measuring and assessing circularity performance

May 2024

ISO 59040

Circular economy
Product Circularity Data Sheet

Feb. 2025

ISO 59014

Environmental management and circular economy
Sustainability and traceability of secondary materials recovery – Principles, requirements and guidance

Nov. 2024

ISO EN standard to be elaborated under CEN leadership:
Circular economy - **Extended Producer Responsibility - Requirements and guidelines for implementation**

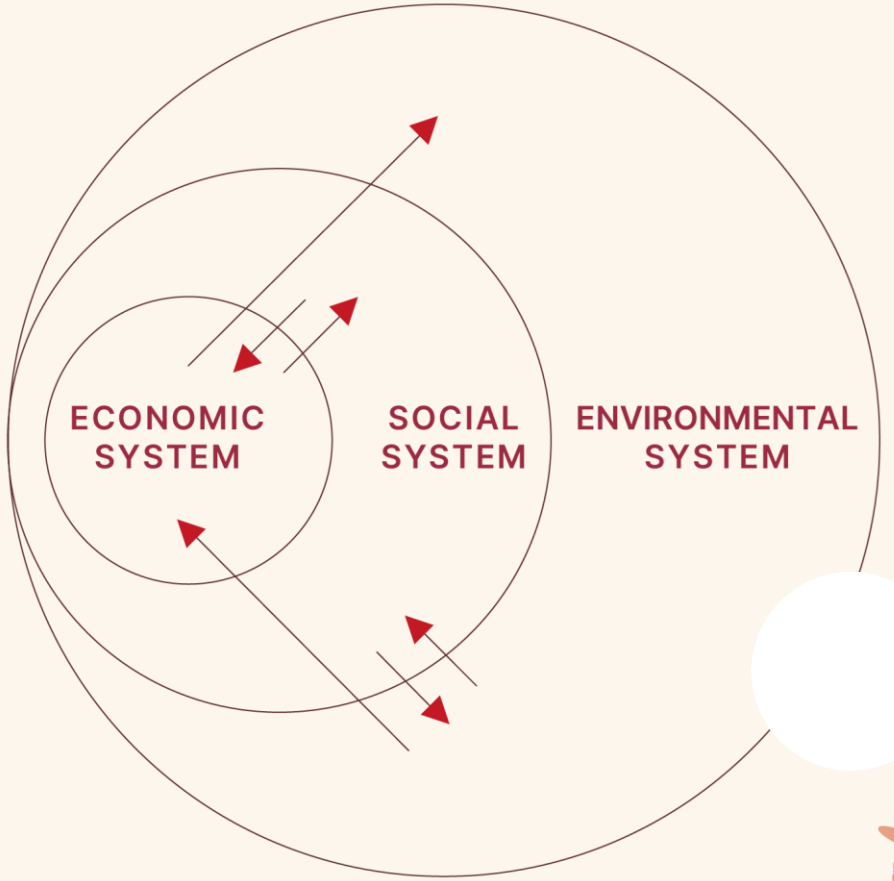
The first international definition

ISO 59004

Circular economy

Economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development.

- ☑ Resources can be considered concerning both stocks and flows.
- ☑ The inflow of virgin resources is kept as low as possible, and the circular flow of resources is kept as closed as possible to minimize waste, losses and release from the economic system



6 principles that are interlinked and complementary

ISO 59004

Systems Thinking

Adopting a **long term approach** ...

Value creation

...to better **use resources in an efficient way**.

Value sharing

Collaborating along value chain or **value network**...

Resource stewardship

...by **closing, slowing** and **narrowing** resource flows.

Resource traceability

Be **accountable for sharing information** with interested parties...

Ecosystem resilience

...and contribute to the **regeneration** of **ecosystems** and **biodiversity.**

Actions that contribute to a circular economy

ISO 59004

Actions[1] described in ISO 59004 are applicable across the value chain. They can be combined in accordance with the 6 principles.

A guidance for resource management can help prioritizing actions to achieve a better circularity performance: **refuse, rethink, source, reduce, repair, reuse, refurbish, remanufacture, repurpose, cascade, recycle, recover energy, re-mine.**

Create added value

- Design for circularity
- Circular sourcing
- Circular procurement
- Process optimization
- Industrial, regional or urban symbiosis

Retain value

- Reduce, reuse, repurpose
- Maintenance and repair
- Performance-based approaches
- Sharing to intensify use
- Refurbishing
- Remanufacturing

Recover value

- Reverse logistics
- Cascading of material
- Recycling
- Waste management
- Material recovery
- Energy recovery

Regenerate ecosystems

- Removal of harmful substances, remediation of soil and water bodies, mitigation and adaptation to climate change impacts, protection of biodiversity

[1] Non exhaustive list

Focus - Guidance for resource management actions

This resource management guidance is intended to help organizations **prioritize actions to increase circularity performance**.

A **life cycle perspective** should guide the organization in the identification of the best action for their value creation model.

Refuse	Make solutions redundant by abandoning its function or by offering the same function with a radically different solution.
Rethink	Reconsider design and manufacturing decisions. Make service use more intensive (e.g. through sharing or by putting multi-functional products on the market).
Source	Select recovered or renewable, sustainably sourced or produced resources. Use resources that can be easily recycled or returned to the biosphere. Reconsider formulations.
Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials.
Repair	Restore a defective or damaged product so that it can be used in its original function.
Re-use	Re-use a discarded product which is still in working condition and fulfils its original function.
Refurbish	Restore to a useful condition during expected service life with similar quality and performance characteristics.
Remanufacture	Return an item, through an industrial process, to a like-new condition from both a quality and performance perspective.
Repurpose	Adapt a product or its parts for use in a different function than it was originally intended without making major modifications to its physical or chemical structure.
Cascade	Shift recovered materials from one loop to another to optimize feedstock flows through additional cycles, often with decreasing quality and quantity. When adopting for biobased material, cascading implies repeated use of renewable resources at decreasing quality, with final treatments such as composting, energy recovery or biodegradation, and safe return of the material to the environment.
Recycle	Recover and process material to obtain the same (high grade) or lower (low grade) quality through activities such as recovery, collection, transport, sorting, cleaning and re-processing.
Recover energy	Generate useful energy from recovered resources.
Re-mine	Mining or extraction from landfills and waste plants can be possible in some cases if mining or extraction activities are sustainably managed.

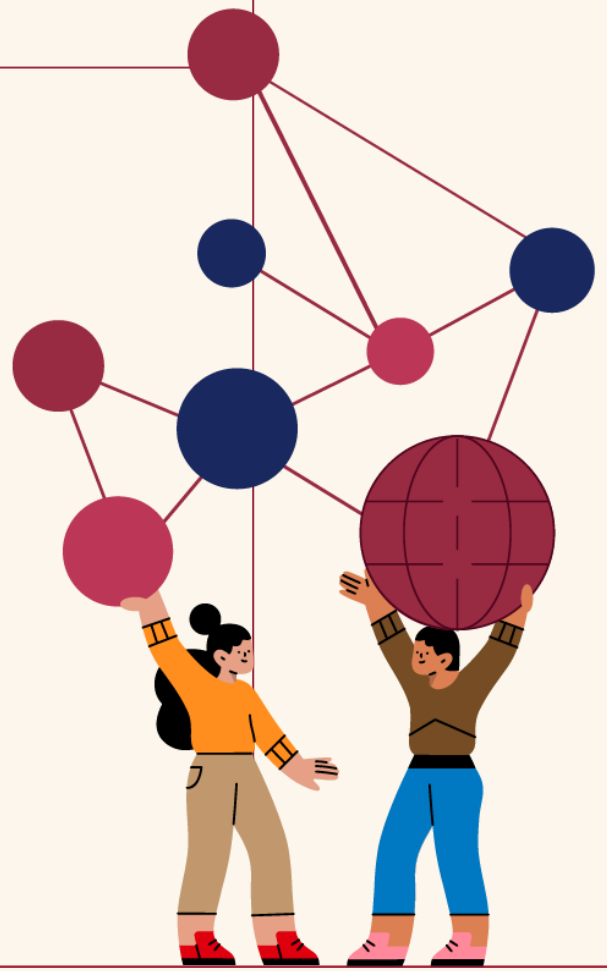
Transition of business models and value networks

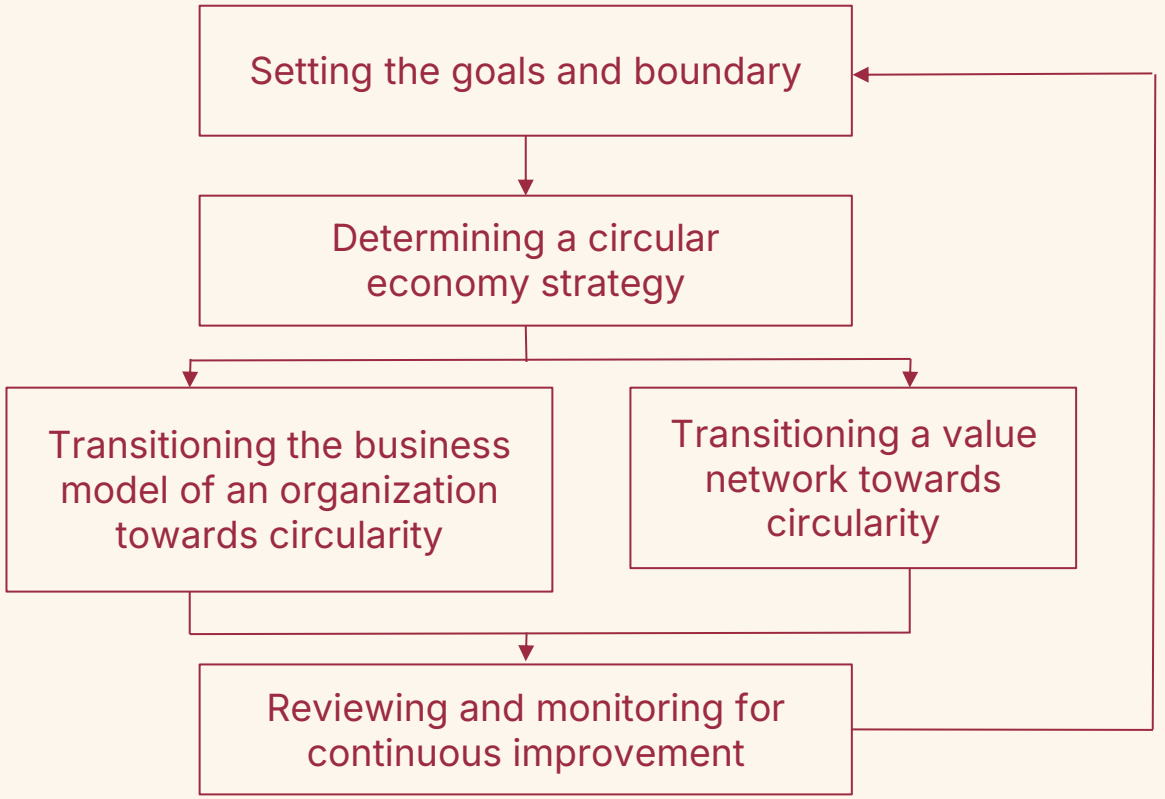
ISO 59010 in a nutshell

1. Analyze the **current business models and value networks ...**

2. ... through the **circular economy principles** and actions ...

3. ... to transition to **circular business models.**





Transition of business models and value networks

ISO 59010, **changing the tide to redress balances**

- ☑ **To translate the regulatory requirements into circularity strategies and business models** (unless already embedded in policies)
- ☑ **To question oneself and the strategies of stakeholders** (e.g. government or industry sponsored Extended Producer Responsibility schemes)
- ☑ **To set and meet measurable circularity objectives**
- ☑ **To anticipate megatrends** (e.g. digitalisation), and translate them into circularity strategies.

- **A change of mindset**: integrating consumers, manufacturers, value chains, and material conditioners
- **Better governance** based on an analysis and inclusion of an **ecosystem of stakeholders**
- **Business Models** that create and exploit the market levers **for material recovery and value retention**
- **Investments from ecodesign to downstream facilities**, that are market responsive
- **Value propositions**, either set individually or part of a wider construct, that cascade in value chains, and which **enable risk sharing** for circularity assets
- Objectives and indicators that are attainable, measurable, individually or collectively

Measuring and assessing circularity performance

ISO 59020

A framework applicable to multiple levels of an economic system, ranging from regional, interorganizational and organizational to the product level.

Monitor goals and actions

E.g. reduce, repair, reuse, remanufacture, recycle, ...

Measure resource flows

E.g. inflows, outflows, releases, losses, ...

Assess sustainability impacts

Social, environmental and economic impact and value

Core circularity indicators:

- Resource inflows
- Resource outflows
- Energy
- Water
- Economic

And examples of additional indicators.

Sustainability and traceability of secondary materials

ISO 59014,
8 principles to:

- Seek to **recover secondary materials in a responsible manner**
- Engage with **individuals involved in subsistence activities**

Respect for interested parties' interests	Value chain responsibility	Responsibility towards interested parties engaged in subsistence activities	Life cycle perspective
Safe, healthy and equitable working conditions	Protection of the environment	Resource conservation	Enabling of circular resource flow using secondary materials

Sustainability and traceability of secondary materials

ISO 59014, requirements and guidance

Operational requirements

- Classification and determination of recovery pathways
- Collection
- Sorting
- Material recovery processes
- Logistics

Organizational requirements

- Monitoring and evaluation
- Interested party engagement
- Responsibility towards the value chain
- Responsibility towards individuals engaged in subsistence activities
- Equitable working conditions
- Risks
- Resource use
- Competencies and training

Traceability requirements

- Upstream
- During the processing
- Downstream
- Depollution
- Communication
- Continual improvement

Ease circular economy data exchange

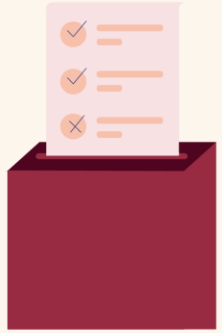
ISO 59040 in a nutshell

- Establishes a general methodology for **information exchange supporting the interoperability of circular economy related information**, based on the use of a product circularity data sheet (PCDS).
- **Specifies requirements** for completing a PCDS by an organization, when acquiring or supplying products in order to permit **the exchange of circular economy related information** about those products.

When establishing a PCDS, acquirer and supplier should consider a relationship strategy, plan and associated agreement to:

General methodology

- Identify circularity aspects for determined products and improve them
- Identify the value network
- Determine responsibilities
- Use of specification data fields
- Use of persistent identifier data fields



Specific requirements

- Establish and maintain a PCDS Template including mandatory and additional statements:
  - Company and product information,
  - Material inputs,
  - Circular production,
  - Durability and extended lifetime,
  - Circularity at end of product use period,
  - Circularity benefit.

An international survey to feed the revision

Gather feedback from the field

- [x] Survey is opened by 4th April 2025
- [x] Results to come by August

https://fr.surveymonkey.com/r/ISO_59000

ISO 59004

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ISO 59020

Circular economy
Measuring and assessing circularity performance

- Gather examples of actions, indicators, business models currently implemented
- Improve the common understanding of standards
- Integrate requirements?
- Integrate examples?
- Better consider SMEs challenges
- Etc...

Thank you

Switch to alternative models to decouple the global economy from the consumption of limited resources...

...Let's implement Circular Economy within our organizations!

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To join ISO TC 323 Circular Economy

Contact your national standardization body

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