



Metroselskabet

Focus Areas on Resources and Biodiversity





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Why a publication on resources and biodiversity?

Metroselskabet is an experienced client who works with megaprojects, constructing and operating the Copenhagen Metro.

In this process, the company has an extensive consumption of natural resources such as gravel, sand, wood, metals, and granite. The scarcity of natural resources and the fact that many of them are non-renewable is therefore of significant importance for Metroselskabet.

Also, the company's use of raw materials has a substantial impact on the environment, climate, and biodiversity, as identified in the company's double materiality assessment from 2025.

Denmark and the EU have published new regulations regarding resource use and biodiversity. EU's Critical Raw Materials Act aims to, among other things, enhance recycling and circular economy practices for rare earth metals.

The Nature Restoration law has a target that restores 20 pct. of EU's nature, which gives more space to nature, but may cause potential issues for access to European raw materials. Lastly, Denmark's new building regulations (BR25) includes a CO₂ limit specifically for the construction process. Infrastructure is not covered by this regulation, but it is expected that this will create a solid foundation for carbon accounting across industry partners.

Therefore, Metroselskabet has developed the guiding principles to resources and biodiversity with the intent to become better informed about how our construction activities use resources, specifically scarce and critical resources. This will initiate testing of solutions that promote circular economy and the use of fewer materials and will make the foundation for taking even more responsibility as a large public client to push the development further.

Metroselskabet already works with this topic, e.g. as a partner in the CO-PI scaling process and focusing on end-of-life materials in reinvestments. With these new principles, the company wants to go a step further to understand how to reduce our resource consumption, by working with recycling, lifetime extension, and waste management to be able to apply findings in the upcoming projects, M4 extension and M5.

This publication is, in other words, the first step in gathering knowledge and experiences from the circular initiatives with the goal of making Metroselskabet and the industry wiser for future projects. The aim is also that findings from the initiatives can be used to give direction to the new Business Strategy for 2027-2030.



In 2018, **41 pct.** of Denmark's waste and **40 pct.** of material use came from construction.



Circular economy as the solution

Metroselskabet's materiality assessment showed that intense resource use is tied to negative impacts on climate and biodiversity. Furthermore, the demand for raw materials increases and some materials become limited. One way to cut down on the use of virgin raw materials is by applying a circular economy approach. This publication contains initiatives targeting resources by using circular economy principles to directly benefit a reduction in resource use and biodiversity impact.

Resource scarcity

occurs as increasing demand for raw materials gradually limits the availability of resources like metals, minerals, and rare earth elements. This trend can lead to elevated costs, potential supply chain vulnerabilities, and broader market considerations. Additionally, the extraction and processing of these materials involve environmental impacts, including effects on local ecosystems and contributions to carbon emissions.

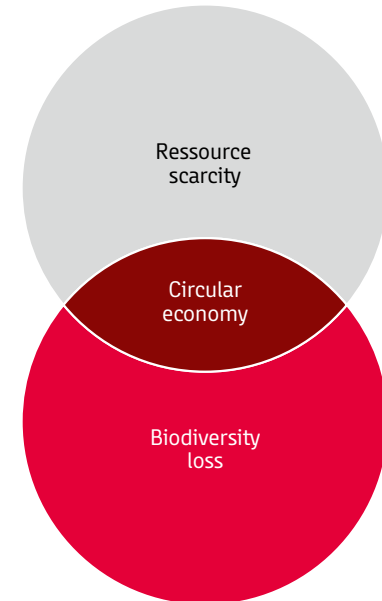
Circular economy

is about keeping materials and products in the economic cycle at the highest possible value for as long as possible. The key principles are reusing, recycling, extending lifetime and minimizing waste. By using resources as efficiently as possible, it reduces extraction of new resources. This can lead to less pressure on the scarcity of a natural resource, reduce impact on biodiversity, reduce pollution and the carbon footprint.

Biodiversity loss

refers to a reduction in the variety of life forms and the capacity of ecosystems to provide vital services such as clean air, water purification, and soil fertility. This is often linked to various human activities, including climate change, land-use changes, and pollution. Within industries like construction, material extraction and associated processes are factors in these environmental changes.

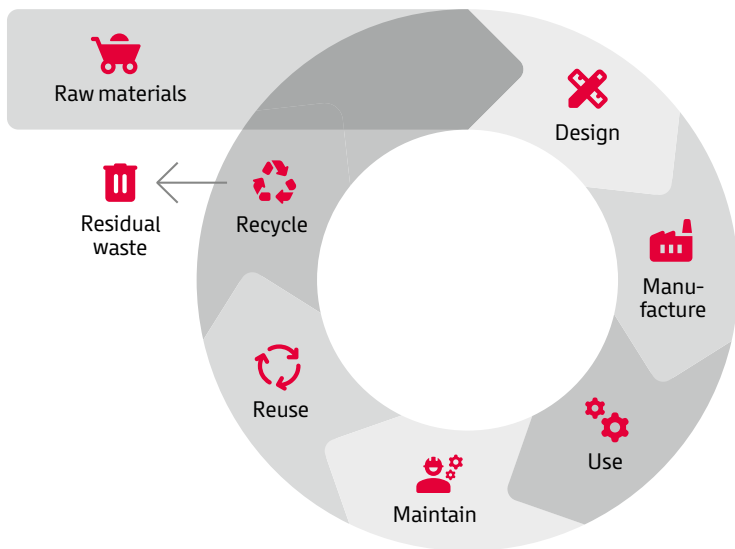
Figure 1
Circular economy is a solution to two problems, resource scarcity and biodiversity loss.



Strategic foundations

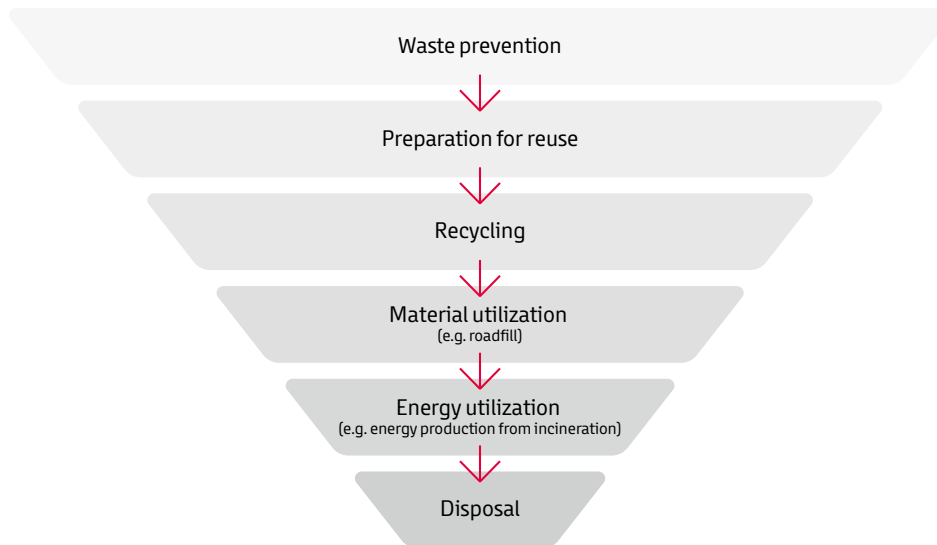
Circular economy and the Waste Hierarchy are two well-known concepts used throughout different industries. Both have a prominent role in Denmark's built environment as the industry works to reduce negative impacts. These concepts acted as the foundation for the development of Metroselskabet's approach and initiatives.

Figure 2
Circular economy



Circular economy is a system where materials never become waste. Products and materials are kept in circulation through maintenance, reuse, refurbishment, and recycling. (Ellen Macarthur Foundation)

Figure 3
Waste hierarchy



Metroselskabet's approach aims to introduce and implement more circular methods to the organisation, its processes, projects and maintenance, by increasing the knowledge on how resources from new and existing projects are reused or repurposed at a high quality. The waste hierarchy is guidance to how resources should be handled, most from the top, least from the bottom.

Focus areas and initiatives

With this publication, Metroselskabet wants to strengthen the focus within the company towards circular economy.

Focus area	Initiative
Design and construction shall enable more efficient resource use during maintenance	#1 A guide to strengthen interface management and design-for-maintenance
Materials and waste are handled to preserve material quality and support high quality repurposing	#2 Potentials for internal reuse of excavated material
	#3 Improved framework for waste and resource management for worksites
Resources, with a focus on critical and scarce, are minimised and recirculated	#4 Potentials to reduce and substitute focus materials
	#5 A guide to support resource screenings and enhance circular resource use in reinvestments



How to implement the new approach

As this approach and publication are the first step for Metroselskabet to gain knowledge and experiences on circular economy, the proposed initiatives will be explored and applied with different methods, depending on what knowledge is already available.

The aim is that results from the initiatives can be applied to future contracts or to formalize processes to ensure uniform methods throughout the organization.

Furthermore, the initiatives can provide a knowledge base for the formulation of input for the next business strategy.

Use of fewer materials and ensuring a second life for materials are both strong contributors to **minimize CO₂ emissions.**

#1 A guide to strengthen interface management and design-for- maintenance



Focus

Identify potentials to enhance the focus on maintenance already during design and construction, which could ease future maintenance and reinvestment activities and reduce material use.



Activities

Develop design guidelines by following the standard IEC 62278 (RAMS) and principles for design-for-disassembly.

Strengthen interface management by establishing interface management processes to ensure knowledge transfer between different project phases and disciplines.



Results

Experience with how to improve cross-functional cooperation on planning, construction, operation and maintenance of the metro with a view to reduce material use.

#2 Potentials for internal reuse of excavated material



Focus

Explore how the vast amounts of excavated materials from construction projects could be recirculated for use in metro projects.



Activities

A feasibility study covering relevant themes, such as overview of potentials and barriers in current legislation, screening of potentials for coming metro projects, including quantities and types, and exploring tender and contractual mechanisms to improve internal reuse of materials.



Results

A clear understanding of if and how excavated materials can be reused internally to be applied to contracts for upcoming projects.

#3 Improved framework for waste and resource management for worksites



Focus

Identify potentials to improve contract framework and management related to waste and resource handling within projects.



Activities

Review and evaluate waste and resource management on recent projects in order to develop a better framework for waste and resource handling with future contractors that considers topics such as take-back schemes, direct reuse, or optimized resource use.



Results

Updated tender and contract material regarding waste and resource use during the construction phase that aligns with circular economy principles.

An understanding if the CO₂ principles from BR25 can be applied to part of the construction phase for metro projects.

#4 Potentials to reduce and substitute focus materials



Focus

Explore how metals, wood, gravel, sand and granite can be reduced or substituted in projects to other materials.



Activities

Conduct studies to identify material use and quantity in projects.

Identify ways to reduce, avoid or substitute material use on projects, specifically focus materials.



Results

Knowledge and possible solutions to reduce, avoid or substitute materials that can be included in future project contracts.

#5 Resource mapping and enhance circular resource use



Focus

How materials, specifically granite and electronics, can be recirculated when decommissioned during reinvestment projects.



Activities

Develop a guide with potential strategies and alternatives to enhance circular resource use for each material that includes resource mapping during project planning.

Review current projects and collect knowledge from the market about recirculation of focus materials.



Results

Written guidelines for project leaders of reinvestment projects to ensure a circular approach is applied.





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