



Nordic Innovation

*We connect people, businesses and
organizations for a more sustainable future*



Sustainable Business Transformation - Circular Economy and the Nordics

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Nordic Innovation





The Nordic Council of Ministers



Secretary General The Nordic Council of Ministers' Secretariat





The Nordic Council of Ministers



- Funded by the *Nordic Council of Ministers*
- Supports projects and activities to stimulate **innovation, entrepreneurship** and **new solutions**
- Focus on **startups & SMEs**, organisations, and networks
- Works to improve the framework conditions for Nordic markets and **exports**
- Priorities based on the Nordic **Co-operation Programme** for Innovation and Business Policy (2018-2021)





Nordic Council
of Ministers

NORDIC CO-OPERATION PROGRAMME FOR BUSINESS AND INNOVATION POLICY 2018–2021



Our Programmes

Our Mission

Innovation

Stimulating
**sustainable
growth,
entrepreneurship,
innovation** and
competitiveness
in the Nordic region.



Our Vision 2030

A **green** Nordic region

Together, we will promote a green transition of our societies and work towards carbon neutrality and a sustainable circular and bio-based economy.



A **competitive** Nordic region

Together, we will promote green growth in the Nordic region based on knowledge, innovation, mobility and digital integration.



The Nordic region will become the most sustainable and integrated region in the world

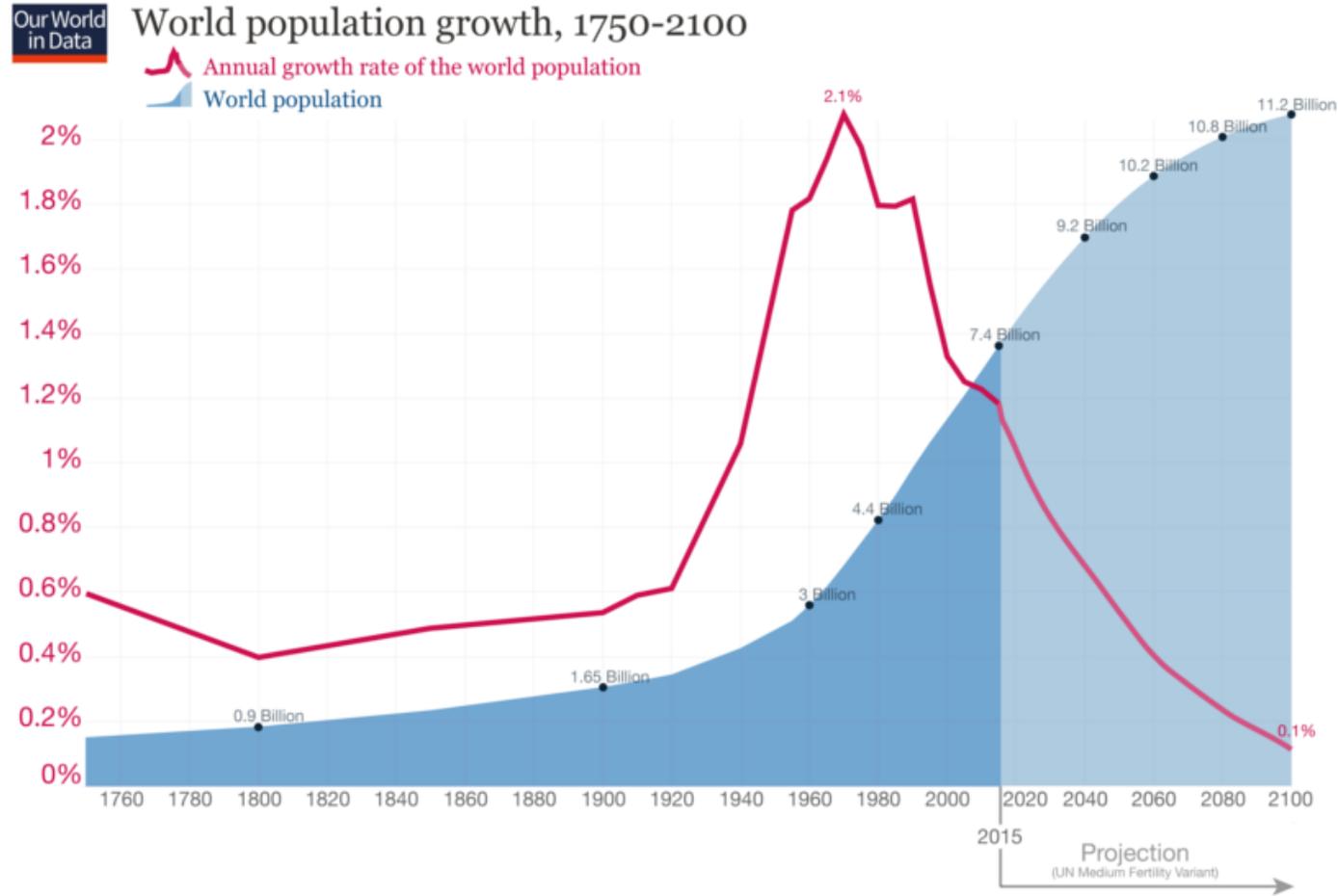
A **socially sustainable** Nordic region

Together, we will promote an inclusive, equal and interconnected region with shared values and strengthened cultural exchange and welfare.

Today's Linear Economy



Earth's Population vs Sustainability



Data sources: Up to 2015 OurWorldInData series based on UN and HYDE. Projections for 2015 to 2100: UN Population Division (2015) – Medium Variant. The data visualization is taken from OurWorldInData.org. There you find the raw data and more visualizations on this topic.

Licensed under CC-BY-SA by the author Max Roser.



Our resources – Living beyond means

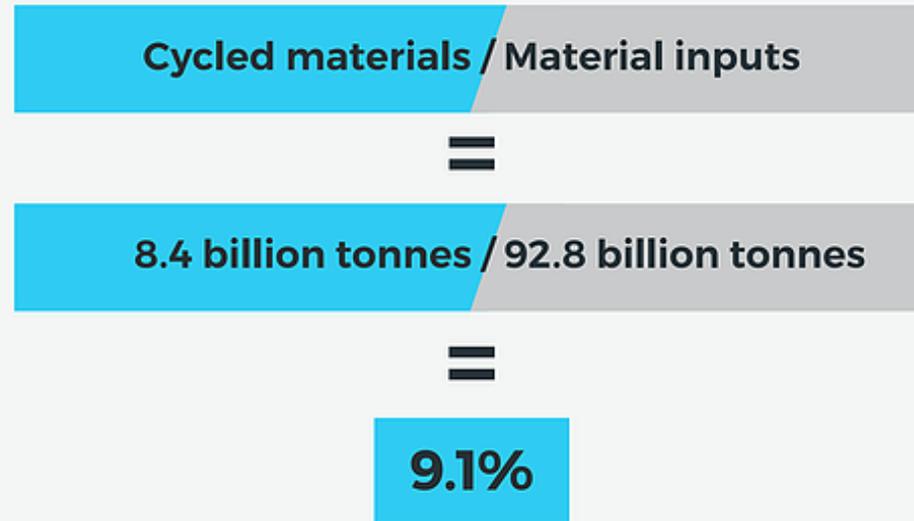
- Extraction of resources increased from 7 billion tonnes in 1900 to **84.4 billion tonnes** in 2015
- A steep further increase is forecasted for 2050, reaching approximately **177 billion tonnes** yearly
- The 92.8 billion tonnes of resources (excluding water) entering the global economy annually equates to almost **34.4 kilograms** of raw materials per person per day
- Of the 19.4 billion tonnes of materials classified as waste, only 8.4 billion tonnes or **9.1% of total material use** of society is cycled, with the remainder incinerated, landfilled, or dispersed into the environment

Ref: Circle Economy, 2018



GLOBAL CIRCULARITY METRIC [%]

When we consider the four fundamentals above it becomes apparent that the last one, the cycling of materials is a key factor. For a metric that captures this essential dynamic we therefore suggest the circularity metric to be the share of cycled materials as part of the total material inputs into the global economy every year. Applying this definition to the numbers in the diagram results in a **GLOBAL CIRCULARITY METRIC of 9.1%** for 2015.

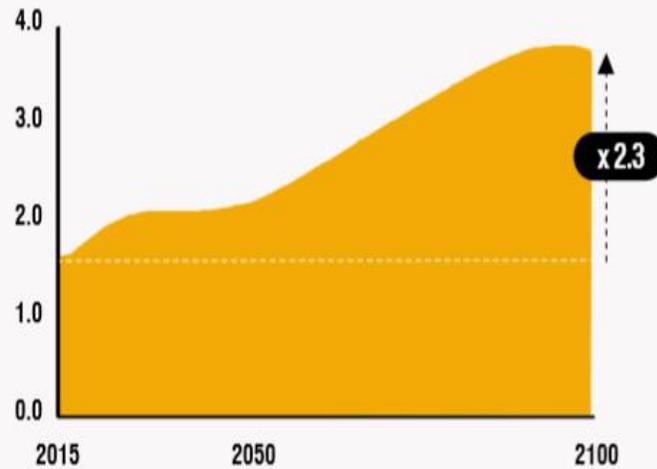


Ref: Circle Economy, 2018



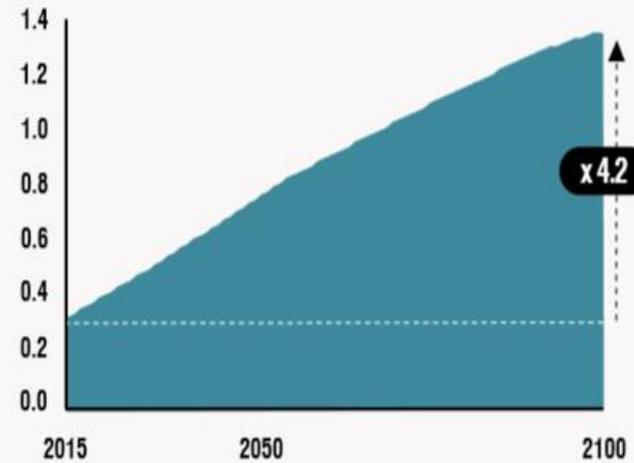
WITH CURRENT PATTERNS OF MATERIALS USE, GLOBAL DEMAND FOR KEY MATERIALS WILL INCREASE 2- TO 4-FOLD

STEEL
Gt STEEL PER YEAR



Steel is used in construction and infrastructure, transportation, industrial machinery, and consumer products. Global steel production now stands at 1.6 billion tonnes per year, having grown by 40% in the decade to 2015. China alone accounted for nearly 95% of this growth. Historically, steel stocks have tended to grow fast once countries reached incomes of around 5000 USD/person, then tapered off at higher income levels, at 12–15 tonnes per person. Our scenario derives the demand resulting if all world regions were to follow this pattern, with convergence to OECD levels of steel stocks of 13 t per capita.

PLASTICS
Gt PLASTICS PER YEAR

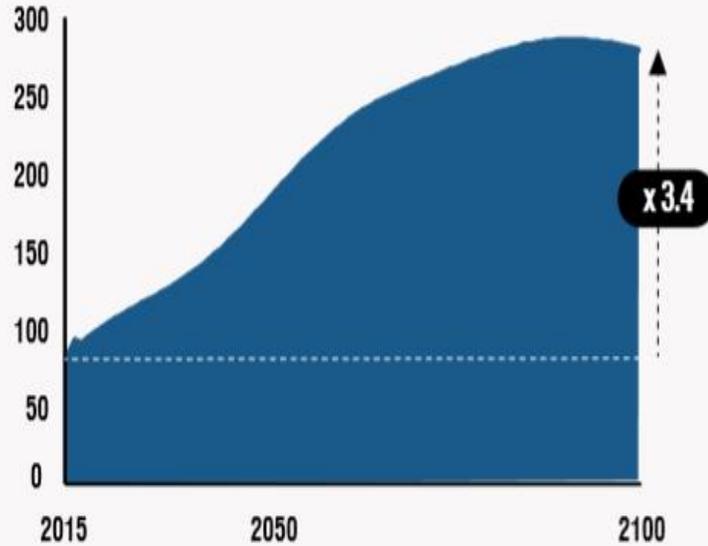


Plastics production has grown by 50% in the past decade, to just under 350 million tonnes per year. In advanced economies, packaging is a major use, followed by construction and automotive. In Europe, current annual use of plastics is about 100 kg/person, while North America is at about 140 kg/person. Our scenario illustrates the outcome if all world regions converge to 120 kg/person.



ALUMINIUM

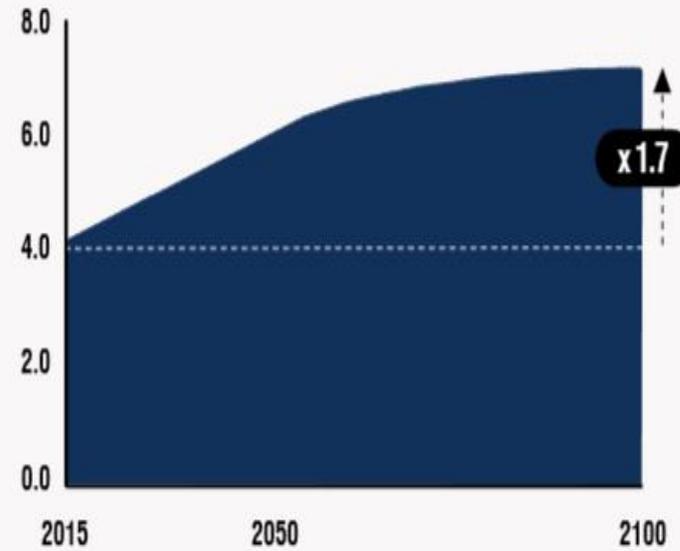
Mt ALUMINIUM PER YEAR



Aluminium is used in packaging, buildings, automobiles and other sectors. Global production of primary aluminium now stands at around 60 million tonnes per year, with an additional 30 million tonnes of remelted aluminium. Stocks have been growing strongly in all advanced economies, though they vary greatly: from 600 kg per person in the United States, to 200–500 kg per person in European countries. Our scenario assumes global convergence to 400 kg.

CEMENT

Gt CEMENT PER YEAR



Global cement production has tripled in just a decade and currently stands at just over 4 billion tonnes per year. Cement production is closely related to construction activity and the build-out of infrastructure. Historically, it has peaked and then declined as GDP per capita grows, but with big variations: China used more cement in three years than the United States did in an entire century. Existing scenarios reflect these uncertainties, with some suggesting minimal further growth, and others predicting an explosion. Our scenario is in the middle, anticipating cement demand of just over 7 billion tonnes per year by 2100.

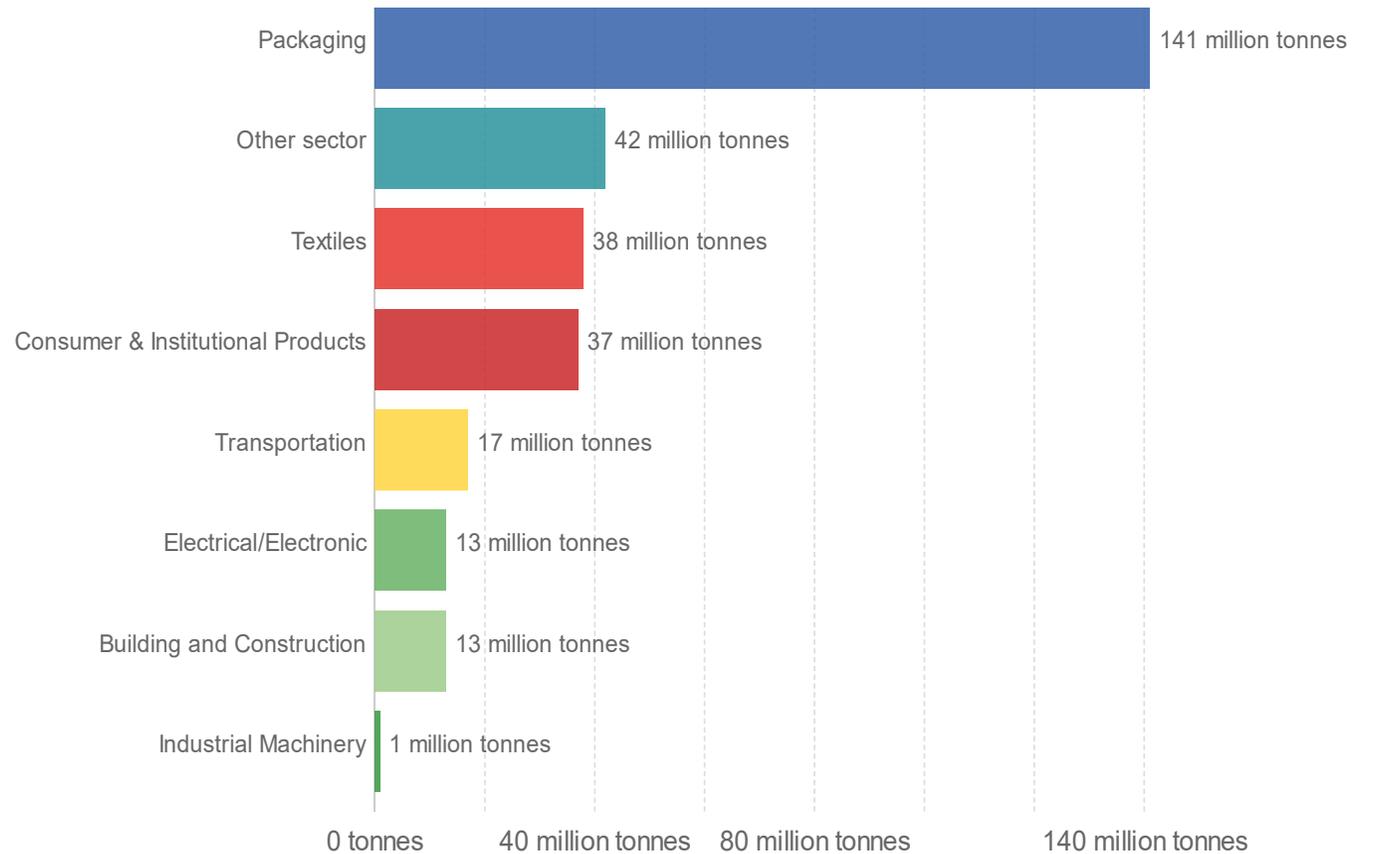


Plastics - Friend or foe?

- **91%** of plastics is not recycled
- By 2050, the seas might contain **more plastics than fish**
- **Packaging** is the primary waste sector

Plastic waste generation by industrial sector, 2015

Global plastic waste generation by industrial sector, measured in tonnes per year.



Source: Geyer et al. (2017)

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Ref: National Geographic and pri.org

Sharing Economy

- A part of the solution?

- The average car lies idle for **90% of the day**
- The average power drill is used for **30 min of its entire life**
- High-end washing machines would be accessible for most households if they were **leased instead of sold** — *customers* would save roughly a third per wash cycle, and the *manufacturer* would earn roughly a third more in profits



Ref: WEF and Ellen MacArthur Foundation, 2018



The Textile Industry



A major global industry – and villain

- Globally, the **USD 1.3 trillion** clothing industry employs more than 300 million people
 - The production of cotton accounts for almost 7% of all employment in some low-income countries – economically important
 - **Clothing** represents more than **60%** of the total textiles used
- In the last **15 years**, clothing production has approximately **doubled**
 - Driven by a growing *middle-class population* across the globe and increased per capita sales in *mature economies*
- The latter rise is mainly due to the '**fast fashion**' phenomenon, with quicker turnaround of new styles, increased number of collections offered per year, and – often – lower prices

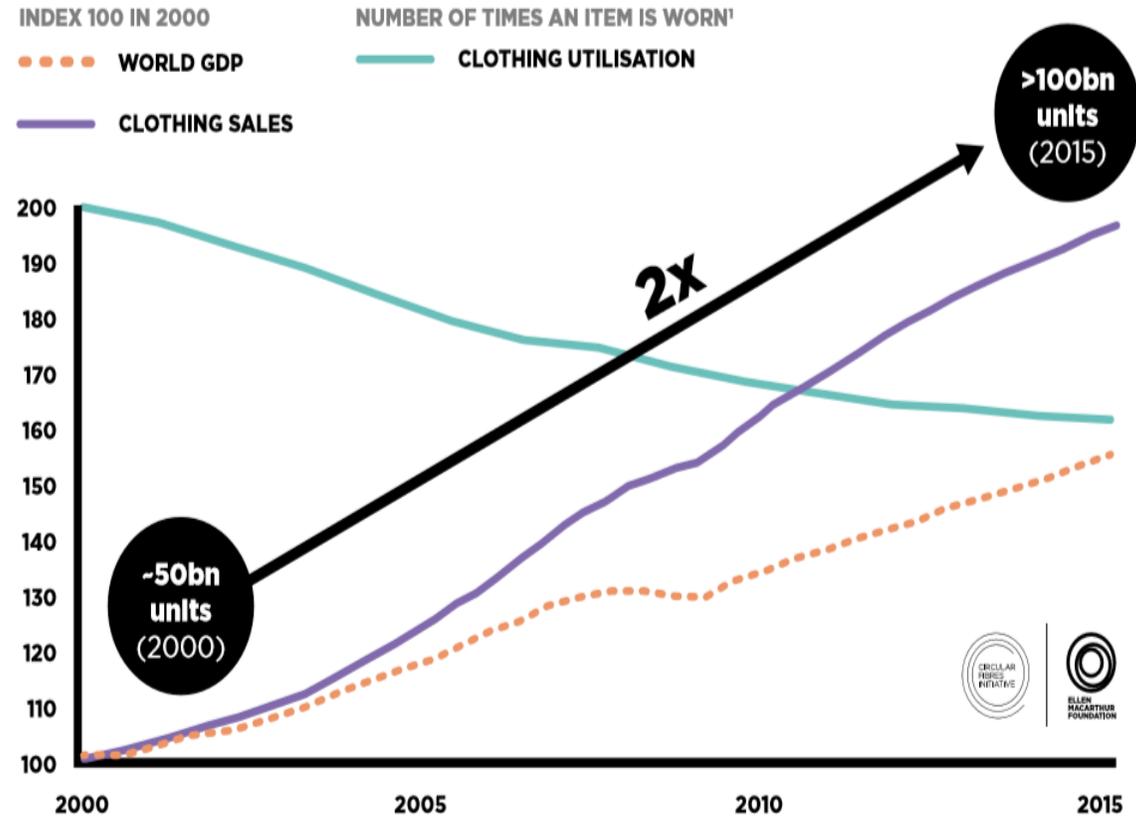


Total Baseline Footprint

- **Footwear** represents about 20% of the total impact (about 1.4% of global climate impacts), while **apparel** (80%) represents 6.7%
- According to Quantis International, these industries combined account for approx. **8.1%** of global climate impacts
- **All flights** globally represent about **4%** of global climate impacts



FIGURE 1: GROWTH OF CLOTHING SALES AND DECLINE IN CLOTHING UTILISATION SINCE 2000



¹ Average number of times a garment is worn before it ceases to be used

Source: Euromonitor International Apparel & Footwear 2016 Edition (volume sales trends 2005-2015); World Bank, *World development indicators - GD* (2017)



More than USD 500 billion of value is lost every year due to clothing under-utilization and the lack of recycling

Furthermore, this **take-make-dispose model** has numerous negative environmental and societal impacts:

- For instance, total greenhouse gas emissions from textiles production, at 1.2 billion tonnes annually, are more than those of **all international flights and maritime shipping** combined
- **Hazardous substances** affect the health of both textile workers and wearers of clothes, and they escape into the environment
- When washed, some garments release **plastic microfibres**, of which around half a million tonnes every year contribute to ocean pollution – **16 times** more than plastic microbeads from cosmetics



The environmental impact of “fast fashion”

The number of garments produced annually



has **doubled**
from 2000 to 2014



exceeded **100 billion**
for the first time in 2014



represents **~14 garments**
for every person on earth

Increase in clothing industry's environmental impact, 2015–25 (projected)

CO2
emissions

+77%

Water
use

+20%

Land
use

+7%



...but there are also good stories



ZARA

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Tomorrow's CE





When shifting from linear to circular approaches, the rule of thumb for optimization is:

'the tighter the reverse cycle, the less embedded energy and labour are lost and the more material is preserved'.

Today's recycling processes are typically 'loose' or long cycles that reduce material utility to its lowest 'nutrient' level.

This is even more true for the incineration of waste.

- Ellen MacArthur Foundation, 2013



The only way forward

- This is the largest challenge of our time. It requires global action and a global transformational change to make a real difference and reach the goals (**UN 17 SDGs**)
- The Nordic countries have put forward an ambitious goal of being the most sustainable region in the world (**Agenda 2030**)
- In December 2018, the Nordic PMs launched the ambition to become **climate/carbon neutral**



The Nordics are doing well on many of the SDGs

- Goal #12 (Sustainable Consumption and Production) remains a major challenge

The SDG Index

Country	Region	SDGs	Rank [▲]	Score
Denmark	OECD members		1	85.2
Sweden	OECD members		2	85.0
Finland	OECD members		3	82.8
France	OECD members		4	81.5
Austria	OECD members		5	81.1
Germany	OECD members		6	81.1
Czech Republic	OECD members		7	80.7
Norway	OECD members		8	80.7
Netherlands	OECD members		9	80.4
Estonia	OECD members		10	80.2



Nordic Sustainable Business Transformation

- Challenging industries for a circular future

SUSTAINABLE DEVELOPMENT GOALS



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Our ambition

- The Nordics as agile frontrunners in CE
- Stimulate Nordic companies to implement sustainable circular business models
- Develop new Nordic solutions that enable the transformation towards a circular economy

Targeted Outputs

- A stronger Nordic ecosystem within circular economy
- A speedier transition to a circular economy in the Nordics
- Global market opportunities and the Nordics as an Innovation Hub



Action areas: 4 Main Modules

Competence

Driving change through tools
for new business models

New Solutions

Accelerating business
through innovation

Circular Cities

Public and private actors working
towards new city solutions

Eco-systems

Awareness raising and
networking activities



LOOP

Building an ecosystem that generates new business and supports the global goals of circular economy.

Scan

1

We scan the market to find solutions & partners globally to solve your challenge within a complex world of circular economy

LOOP

2

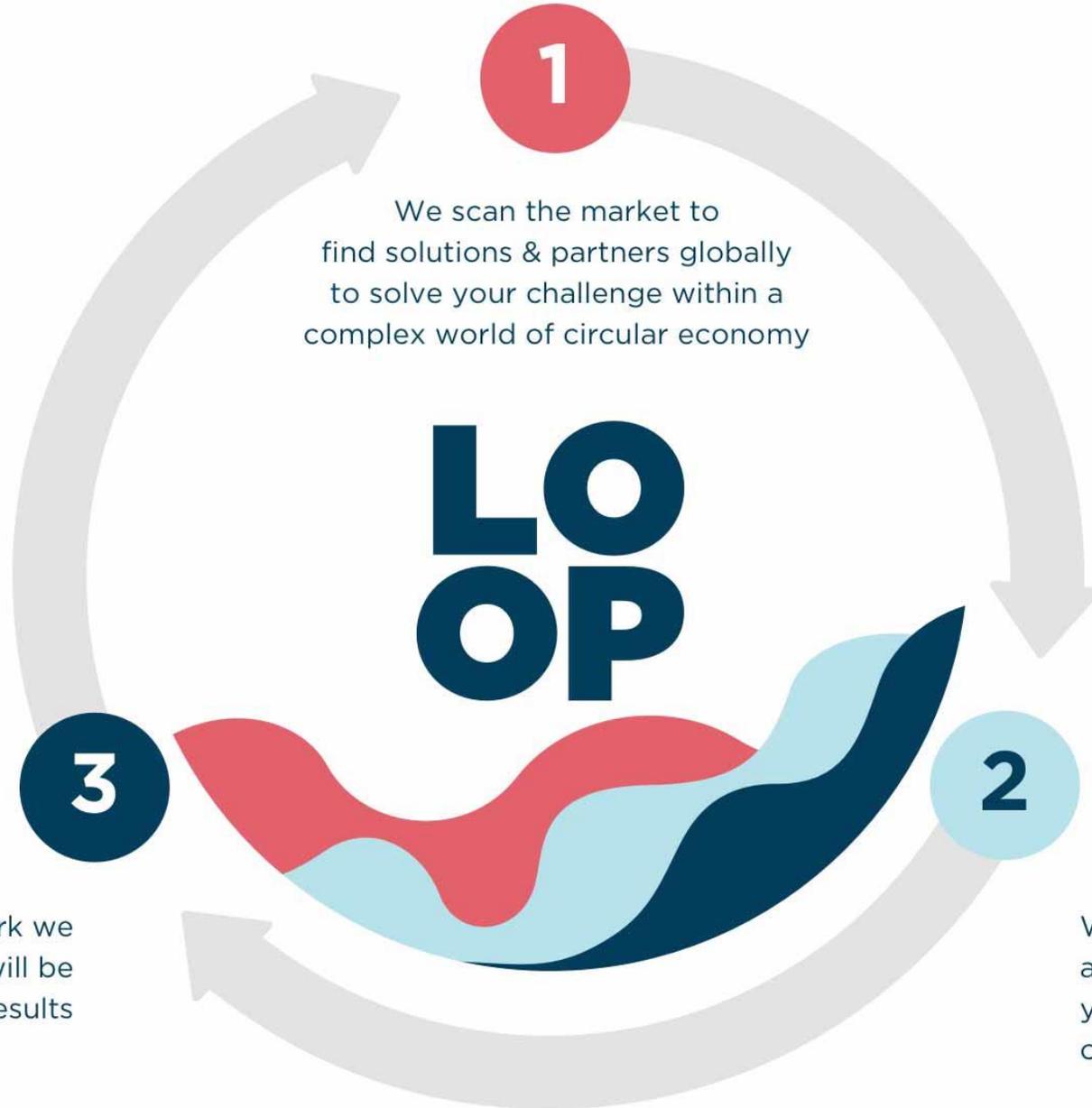
Build

We bring the right people around the same table and help you to build ventures with concrete business goals

3

Act

Within the LOOP framework we make sure that there will be concrete and measurable results





**CE Business Models in the Nordic
Manufacturing Industry
– Ecosystem Perspective**





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SE**



Cradlenet



Moving Forward



Now and Future - 2019/2020

- Open Call for proposals - Circular city solutions
- Expanding LOOP Ventures
- Participate in various key events - OIW, Slush, etc.
- Continue the Manufacturing Industry - Workshops and Pilots
- C40 World Mayors Summit – Joining our 3 City projects
- Sharing Cities Summit – Develop the Sharing Economy efforts
- SFF x SWITCH, CE and Energy – NIH, Singapore
- Nordic Cluster Meetups

- SXSW – Austin, Texas
- Plans for a joint Nordic Circular Economy Conference



Team Circular #circularnordic



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