

# The Role of Bioplastics in Our Journey Towards Zero Environmental Impact



Bioplastic Conference February 27<sup>th</sup> 2020, Copenhagen

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# Agenda

- Climate Change, Ressource Depletion and The Waste Crisis are different problems
- Reducing our environmental impact is a must-win-battle
- By carefully redesigning our products to fit a circular economy we can reach a state of sustainability
- Bioplastics can be a part of the solution
- We will never compromise on Carbon Footprint

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# The challenges require immediate action



**Resources**



**CO<sub>2</sub>**



**Waste**

**Zero impact  
is our ambition**



## A circular mindset

- **Design and produce our products** so that they can be **recovered and re-used**
- **Minimise consumption** across our value chain
- **Eliminate waste** and turn it into **new resources**

# Embracing a circular mindset

To achieve **zero impact**, we will embrace a **circular mindset**



**CIRCULAR  
SUPPLY**



**CIRCULAR  
COMPANY**



**CIRCULAR  
PRODUCTS**

# Circular Supply

## Projects



1

Reduce supplier footprint

2

Ensure circular procurement



# Circular Company

## Projects



**3**

**Get operations to zero CO<sub>2</sub>**

**4**

**Eliminate waste of energy, water and materials**

**5**

**Support affiliates going green**

# Circular Products

## Projects



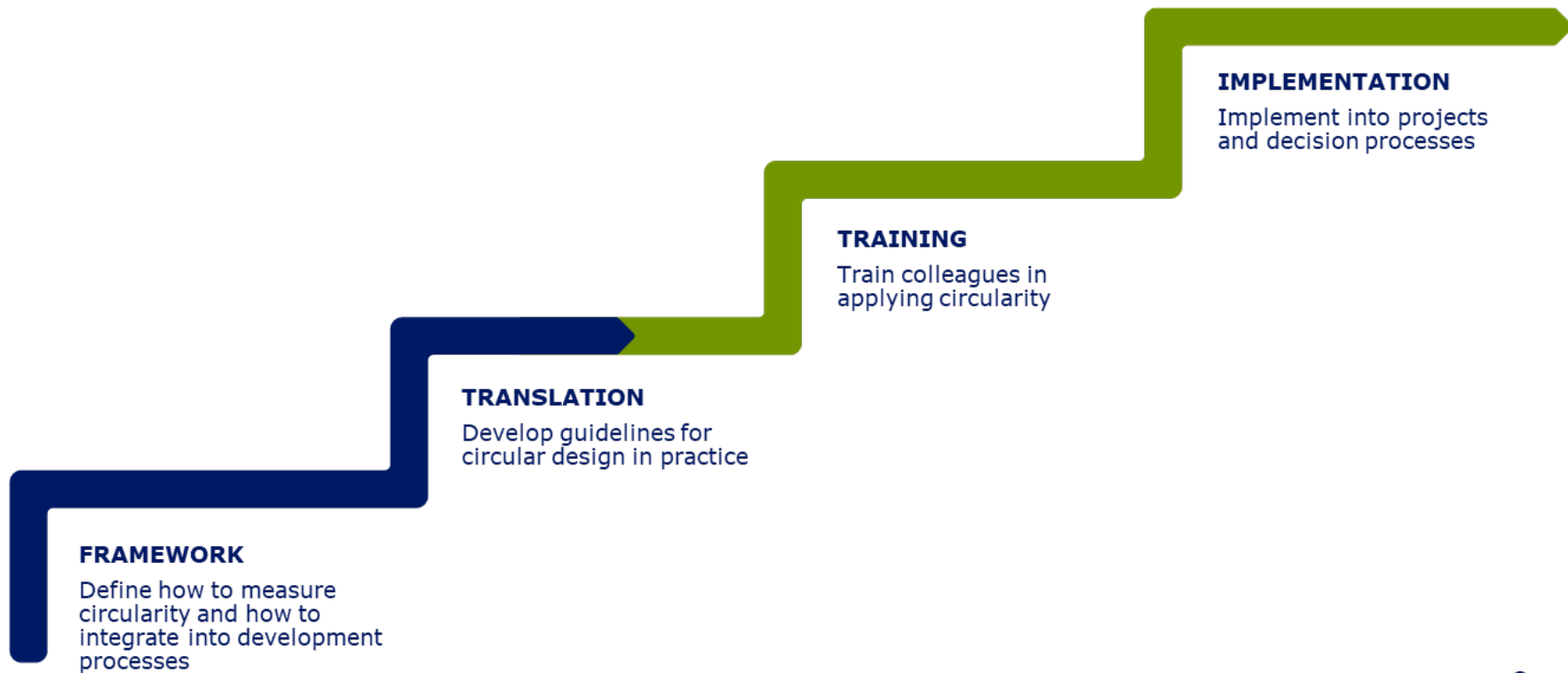
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Design products for circularity

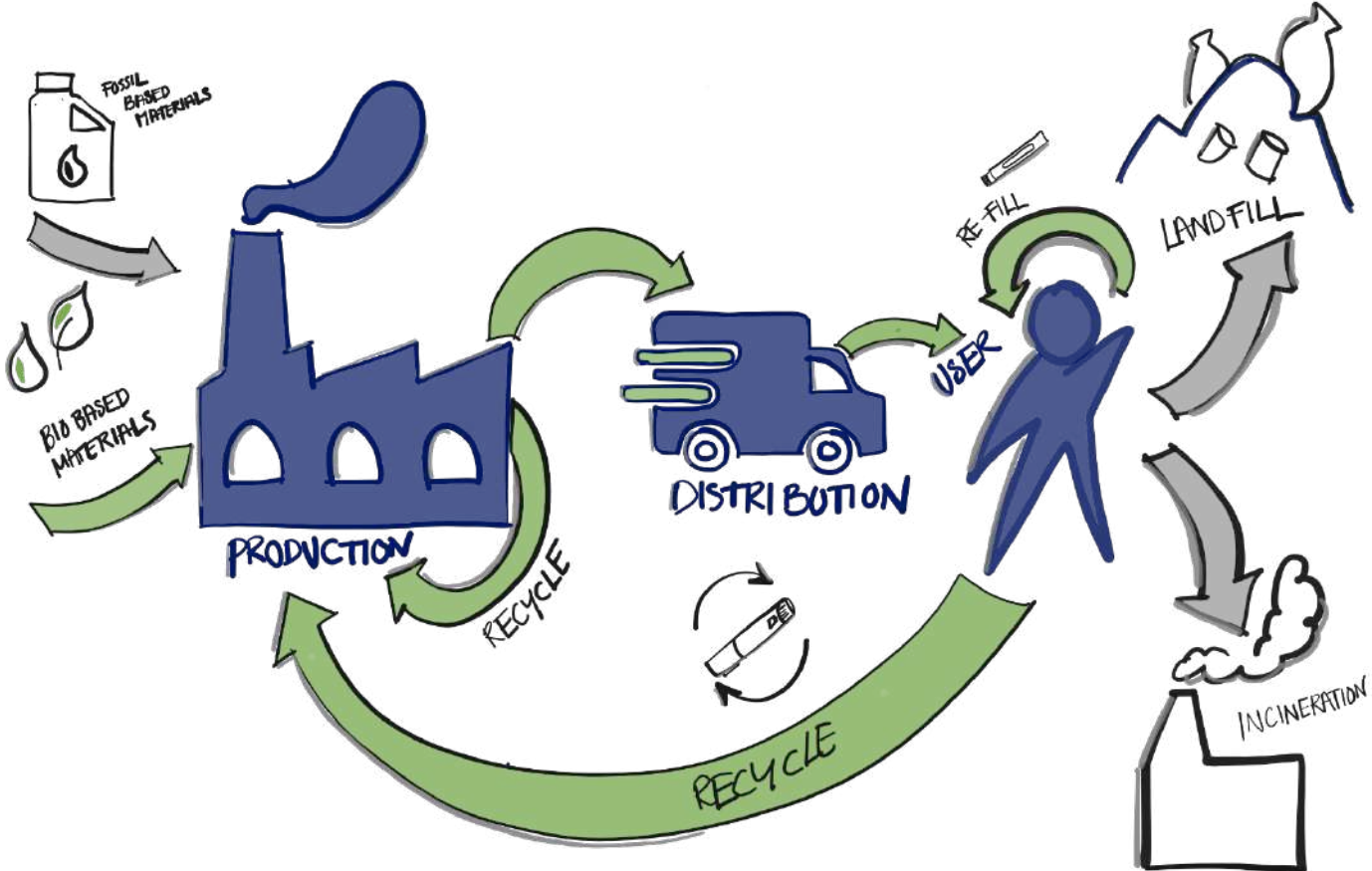
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Solve end-of-life product challenge

# Track #6 Design products for circularity



# The circular product flow



# Circularity is measured on three indicators



## Carbon footprint

kg CO<sub>2</sub>/patient/year

Environmental impact across the full lifecycle of the product and/or packaging



## Sustainable materials

% by weight fraction

Share of materials derived from either renewable or recycled content

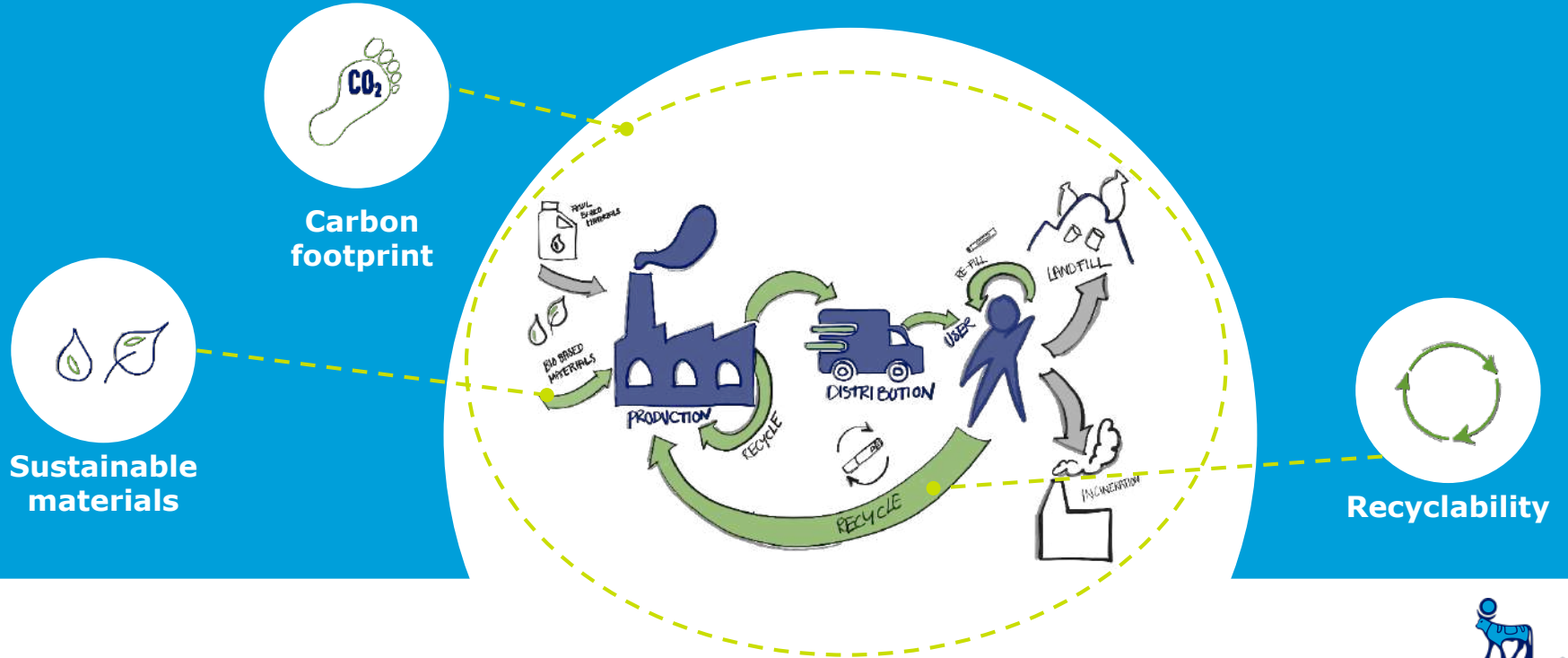


## Recyclability

% by weight fraction

Share of materials that can be retrieved in clean recyclable material fractions at product end-of-life

# The three indicators cover the circular product flow



# Circularity is achieved through four levers

## Circular design guideline



### Design for expected lifetime

Optimise the design to have the lowest impact during intended lifetime



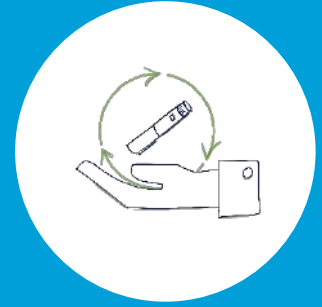
### Design for sustainable materials

Choose renewable, recycled and low impact materials



### Design for no waste in production

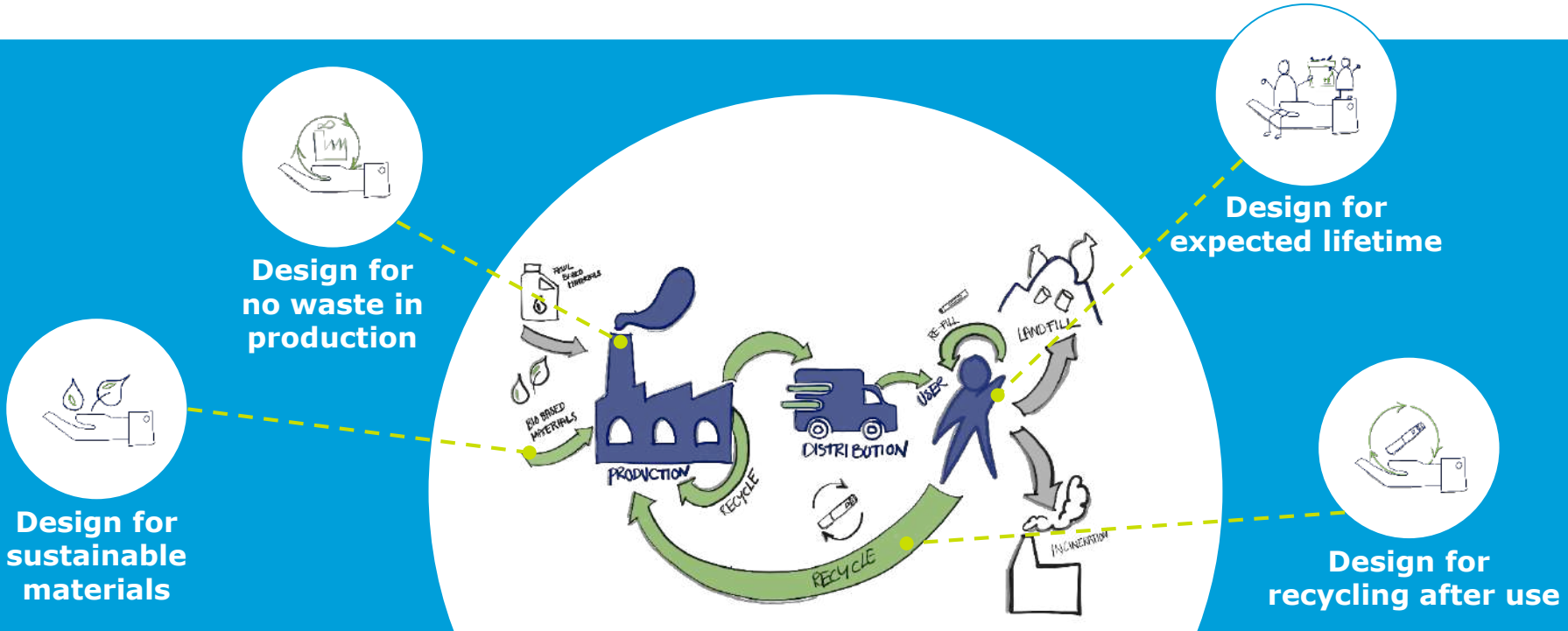
Avoid scrap and design out waste



### Design for recycling after use

Design products that are ready for recycling into new products

# The four levers cover the circular product flow





# A typical pen injector device

- Outer components:  
Housing, Cap, Cartridge Holder, Dial
- Mechanical (internal) components:  
Piston rod, Reset Tube, Scale Drum, Spring base and metal springs



# Typical requirements for pen injector materials

## All components

- Change control (Medical Grade)
- Mouldability (multicavity hotrunner systems -> high thermal stability)
- Recyclability (fit for circular economy)
- Sustainability (non-fossil based carbon source)
- Available in EU, US and Brazil

## Outer components

- Chemical resistance (MCT oil, ethanol, propanol, ...)
- Colourability
- Biocompatibility
- Yield strain (white marks from demolding)

## Mechanical components

- Friction
- Yield stress
- Yield strain
- Elastic modulus
- Dimensional stability (humidity, heat)

# New materials - new possibilities

Material	Potential Origin	Recyclability	Koncept implications	
Polyesters	Recycled Biological	Mechanical Chemical	Take-back	
PC	Recycled (Biological)	Mechanical with traceability	Take-back	
PP	Biological	Mechanical Chemical	Exisiting recycling stream	
Styrenics	Recycled	Chemical	Take-back	
POM	Biological	(Mechanical)	Take-back	

# The 10 Essentials

1. We create value by having a patient centred business approach.
2. We set ambitious goals and strive for excellence.
3. We are accountable for our financial, environmental and social performance.
4. We provide innovation to the benefit of our stakeholders.
5. We build and maintain good relations with our key stakeholders.
6. We treat everyone with respect.
7. We focus on personal performance and development.
8. We have a healthy and engaging working environment.
9. We optimise the way we work and strive for simplicity.
10. We never compromise on quality and business ethics.

*11. We never compromise on Carbon Footprint*

NOVO NORDISK

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# Thank you

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