

# UPM Biocomposites, Teemu Timonen

Technology development manager

Avoinna ollut positio oli mielenkiintoinen ja toimenkuvaltaan monipuolinen.

Ydinosaaminen:

Muovien ruiskuvalu, muovi raaka-aine laatujen kehitys ja testaus.



**UPM**



# Sustainable product design & lifecycle

Teemu Timonen, Technology development manager

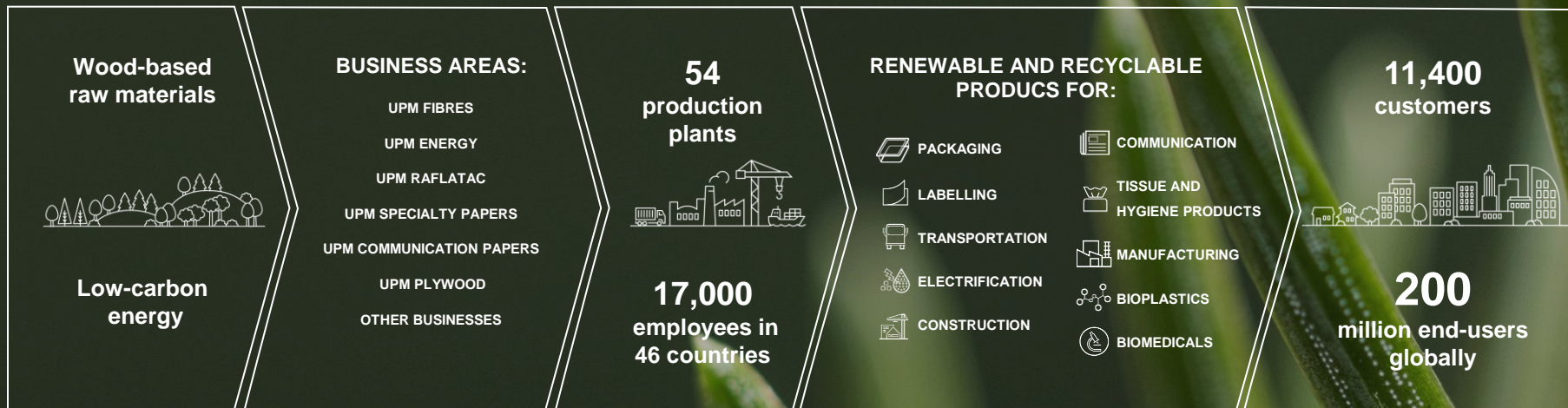
UPM Biocomposites



UPM



# This is UPM



# Our businesses



**UPM Pulp**  
A versatile range of chemical pulp for many growing end uses



**UPM Timber**  
Certified sawn timber



**UPM Forest**  
Sourcing wood raw material for sustainable and recyclable products



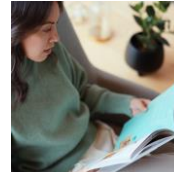
**UPM Energy**  
Low-emission electricity generation of hydro, nuclear and thermal power



**UPM Raflatac**  
Self-adhesive label materials for promotion, information and functional labelling



**UPM Specialty Papers**  
Labelling materials, release base papers, flexible packaging papers, office and graphic papers



**UPM Communication Papers**  
Magazine paper, newsprint and fine papers for a wide range of end uses



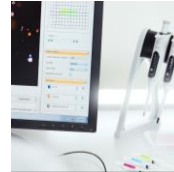
**UPM Plywood**  
Plywood and veneer products for construction, vehicle flooring and LNG shipbuilding



**UPM Biofuels**  
Wood-based renewable diesel and naphtha



**UPM Biochemicals**  
Glycols, lignin products, renewable functional fillers



**UPM Biomedicals**  
Wood-based biomedical products for medical and life science applications



**UPM Biocomposites**  
UPM ProFi composite decking materials and UPM Formi bio-based composites



# Drivers for sustainable product design





# Global megatrends drive demand

## GLOBAL MEGATRENDS



## DRIVERS FOR DEMAND



## OUR SUSTAINABLE SOLUTIONS



# Our climate commitment



## WE ACT THROUGH FORESTS

Committed to climate-positive forestry and enhancing biodiversity



## WE ACT THROUGH EMISSION REDUCTIONS

-65% from own CO<sub>2</sub> emissions  
-30% from CO<sub>2</sub> emissions of supply chain



## WE ACT THROUGH PRODUCTS

Innovative products  
Scientifically verifying the climate impact of all our products



DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

**BUSINESS AMBITION FOR 1.5°C**   **OUR ONLY FUTURE**

**THE Paris...  
CLIMATE 10 years  
PLEDGE Early**

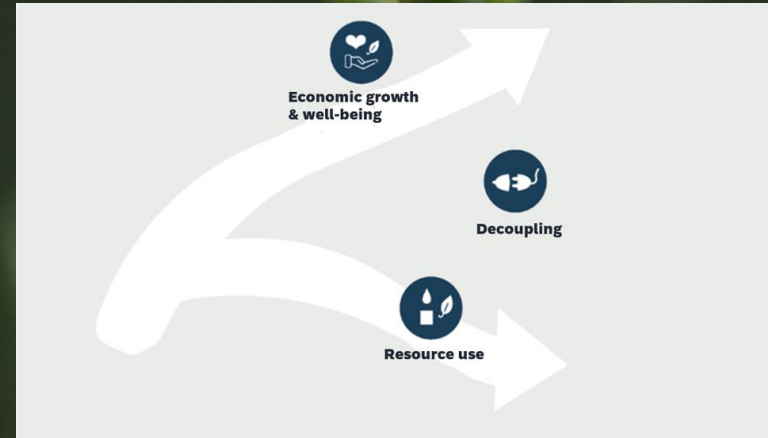
UPM **BIOFORE-BEYOND** FOSSILS

# EU Green Deal to make sustainable products the norm

The first climate neutral continent



Economic growth decoupled from resource use





# Drivers

- **Regulatory push towards biobased plastics**

- The European Green Deal
  - Climate Law: The Climate Law sets the legal framework for the EU's commitment to reach climate neutrality by 2050 and establishes an interim target of reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels.
  - Circular Economy Action Plan: Focusing on designing reusable and recyclable products, reducing packaging, and limiting single-use item production
    - EU Packaging- and packaging waste regulatory (PPWR)
    - Single-Use Plastics Directive (SUP)
- The exact biobased content of the material must be specified in detail to prevent misleading the consumers
- EU will address the sales- and manufacturing of biobased, biodegradable and industrially compostable plastics to prevent greenwashing and rule out materials that are harmful for the environment
  - UPM Formi Biocomposites do not fall within the list of restricted materials
- The raw material should be sourced by only using side streams, residues or waste, while not causing any biodiversity loss, deforestation or competition with food chain.

# 4R's of Sustainability

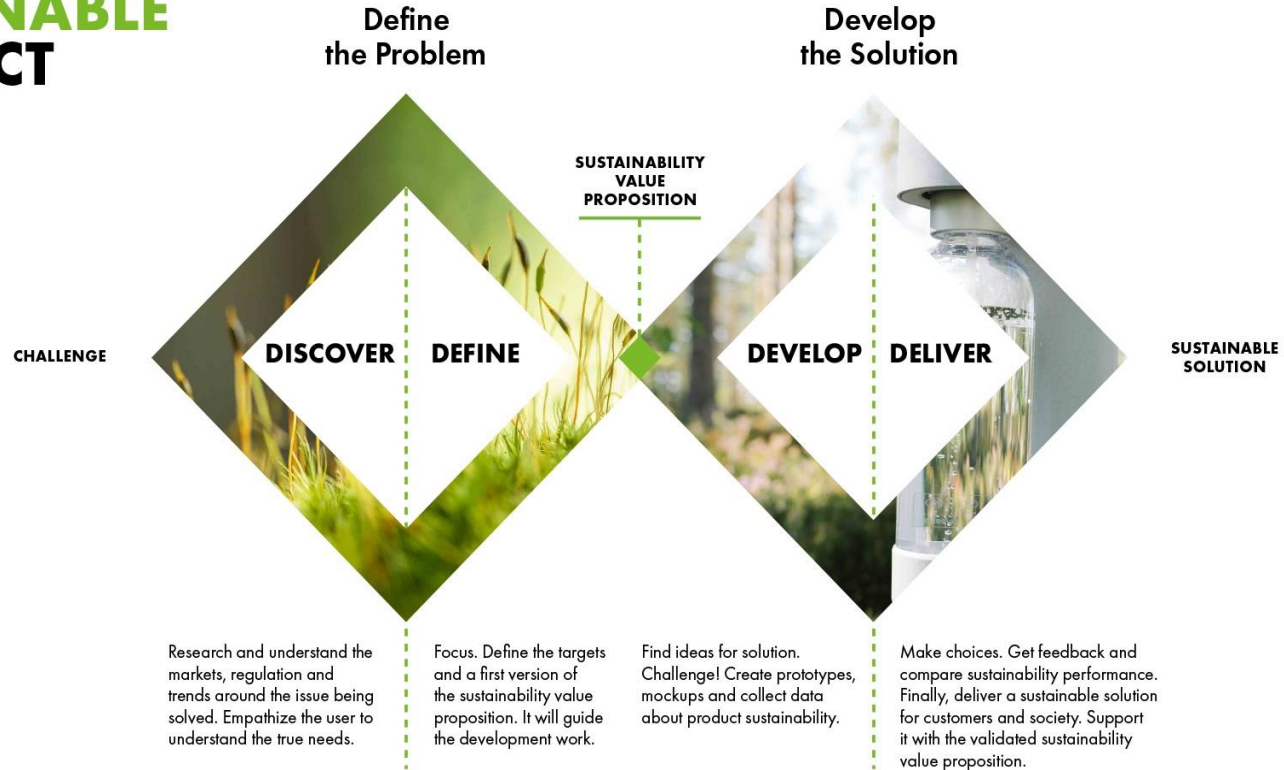


**3R**

**Renewability**



# UPM SUSTAINABLE PRODUCT DESIGN

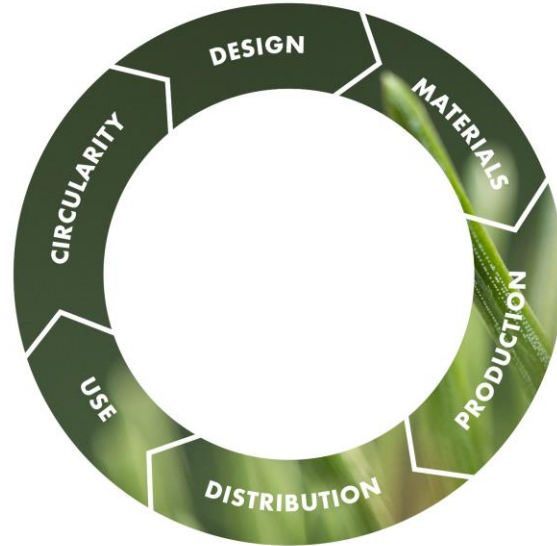


Our concept is based on the British Design Council's 'double diamond' framework.

# SUSTAINABLE PRODUCT LIFECYCLE



- Regulation >
- Trends >
- Markets >
- People >



> Future Beyond Fossils



UPM supports the Sustainable Development Goals



# Sustainable Product Lifecycle approach



1

The main drivers for designing sustainable products and services are **regulation**, **trends** and **markets**, but also impacts on **people** – specifically from a usability and wellbeing point of view.

2

Sustainability needs to be addressed for the whole value chain and taken into consideration already in the design phase.

3

Our approach is divided into six lifecycle steps that guide our design process (design, materials, production, distribution, use, and circularity).

4

Tools like LCA, and laboratory analysis methods (eg. biodegradability and recyclability tests) are used to obtain validated data.

5

Our approach is inspired by The Sustainability Guide [www.sustainabilityguide.eu](http://www.sustainabilityguide.eu)

# Sustainable Product Lifecycle

Life Cycle Thinking

Circularity

Digitalization

**Design**

Systems thinking

Customer &  
user focus

Design for  
purpose

## Design

Key to understand user needs and analyse new product's environmental and societal impacts throughout its entire lifecycle

System-wide approach recognizing that everything is interconnected (i.e. life cycle thinking)



# Sustainable Product Lifecycle

Materials  
Beyond Fossils

Respect for people  
and human rights  
in supply chain

Replace harmful  
substances

**Material**

More with less

Sustainable  
forestry & land use

Low  
environmental  
footprint

## Material

Key to secure safe and responsibly sourced raw materials with guiding principle to replace fossils with renewable, recyclable and recycled materials

Focus on material efficiency, minimizing material and energy usage over the products life cycle

# Sustainable Product Lifecycle

Decent working conditions

Zero waste and zero pollution

Side stream & residues utilization and productization

**Production**

Respect of local communities

Resource efficiency

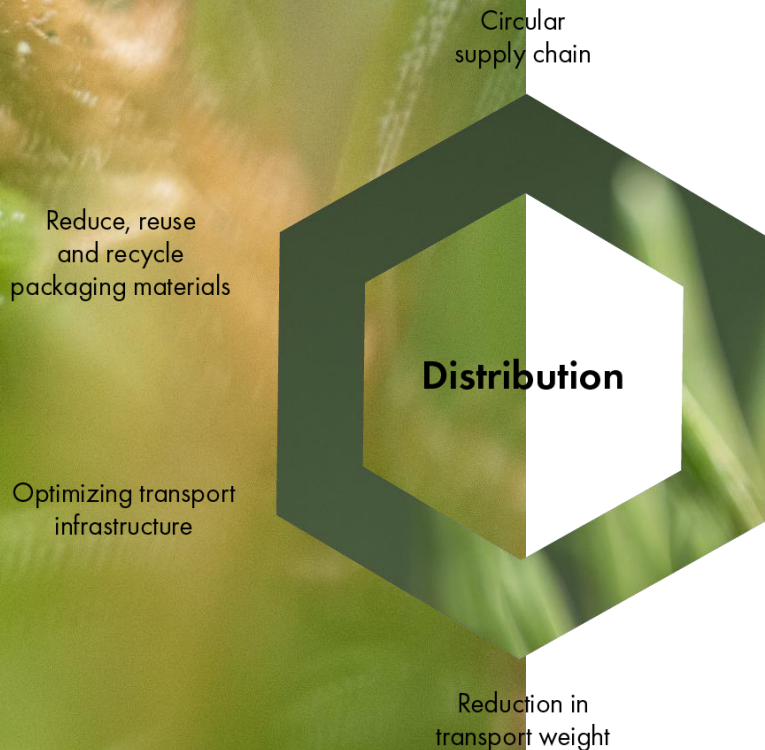
Closed loops

## Production

Key to ensure respect for human rights and minimise negative impacts from processes through careful consideration of people and optimized production

Focus on resource efficiency, energy efficiency, zero waste and creation of industrial symbiosis (i.e. utilization of side streams and residues)

# Sustainable Product Lifecycle



## Distribution

Sales & marketing for supporting sustainable consumption

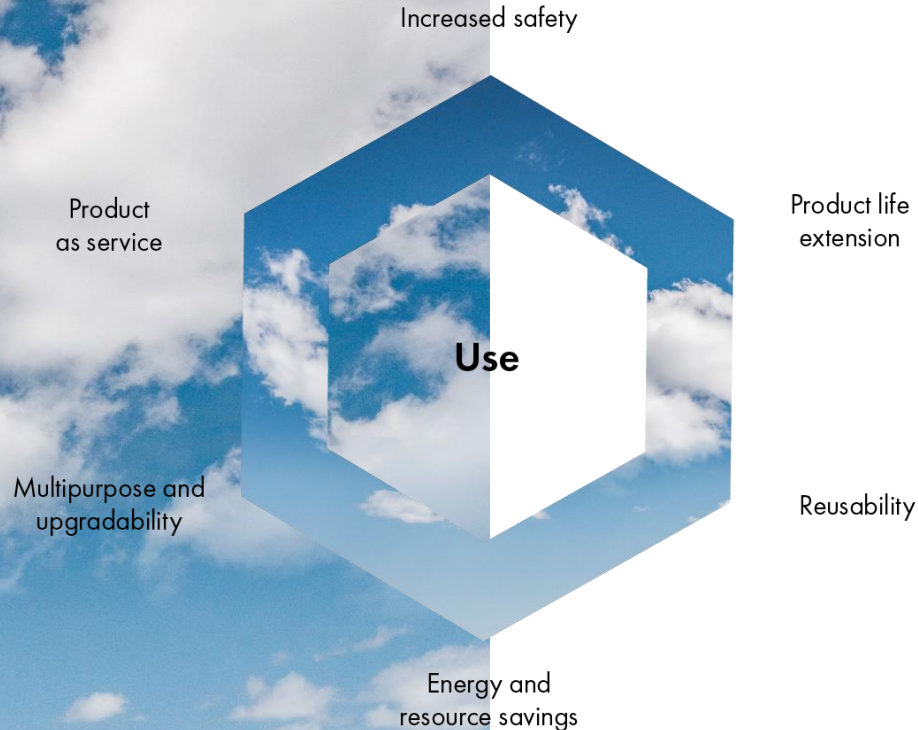
Key to maximise efficiency in packaging and transports

Create a market pull for sustainable products utilising validated, transparent and targeted marketing

Validated sustainability claims



# Sustainable Product Lifecycle

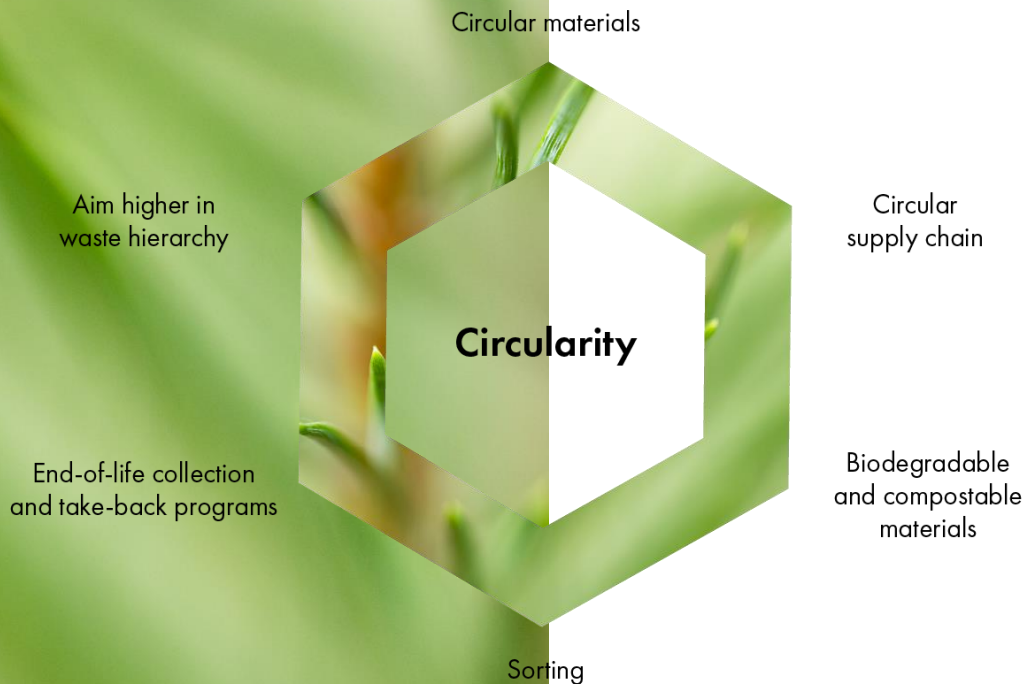


## Use

Key to design the product to ensure minimal energy and other resource consumption during its usage, minimise waste and pollution at the end of the life when disposed by consumer

Focus on customer/consumer needs in order to design products that are supporting sustainable consumption

# Sustainable Product Lifecycle



## Circularity

Key to assume ownership of the product throughout the value chain in collaboration with other players and enable circularity

Focus on securing highest possible recycling and recovery stage

# UPM Biocomposites

- Implements UPM Biofore strategy:  
**Creating innovation driven, high-performing bio based alternatives to non-renewable materials**
- One of the leading natural fibre composite manufacturers in Europe
- Corporate start-up – part of UPM Kymmene Oyj
- Great patent portfolio on material and production technology





# UPM Biocomposites



## UTILIZING EXISTING WASTE STREAMS



Plastic & paper waste



Fibers of  
recycled content



Polymer



**UPM ProFi**

Best in Class decking

## REPLACING FOSSILS WITH RENEWABLES



Forest



Wood-based fibers



Polymer

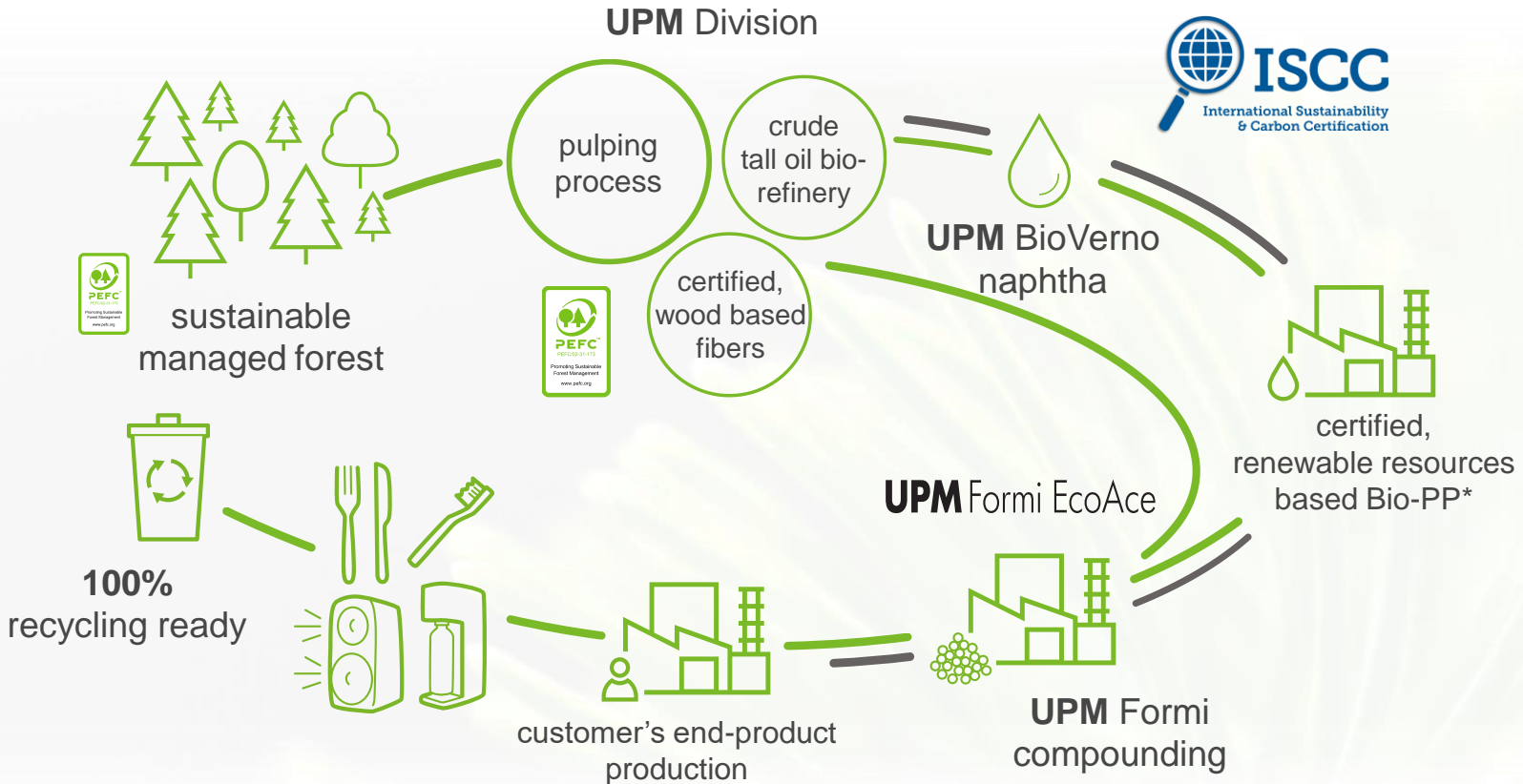


**UPM Formi**

Replacing fossils

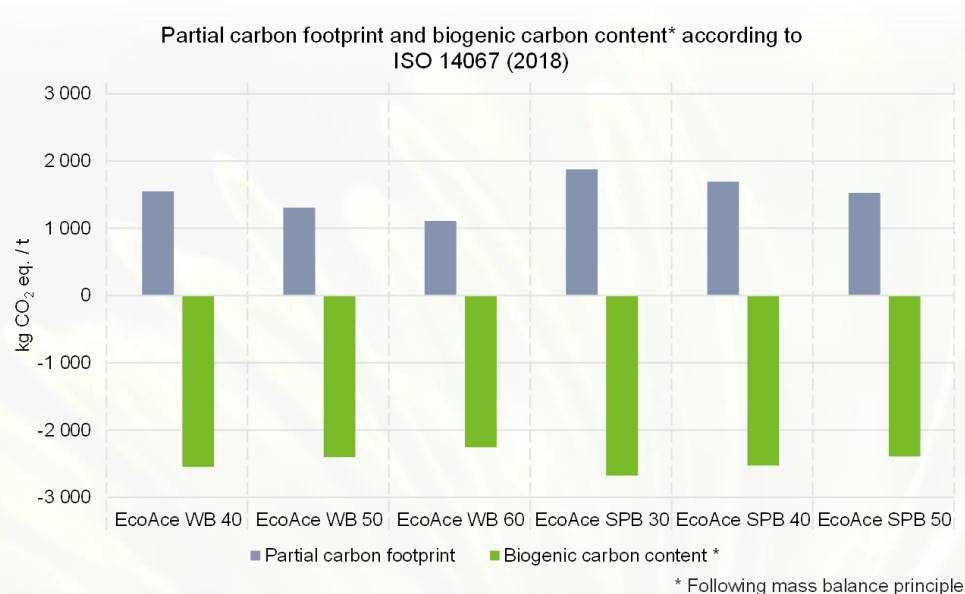
# UPM Formi EcoAce

## Lifetime Cycle



# Partial carbon footprint of UPM Formi EcoAce

- Partial carbon footprint is assessed according to ISO 14067:2018 (Carbon footprint of products). In addition, ISO 14040/44:2006 standards are followed.
- Declared unit of the study is one (1) metric ton of UPM Formi EcoAce, i.e. partial carbon footprint is calculated per one metric ton
- The system boundary is from cradle to gate: system boundary starts from raw material production (“cradle”) and ends when UPM Formi EcoAce is produced and is about to be transported to customer (“gate”), including all relevant life cycle stages and unit processes in between
- So-called mass balance approach is utilized for determining the usage of bio-based feedstock in plastic used for the composite
- **Critically reviewed by third party**
  - ifeu, Institut für Energie- und Umweltforschung







UPM

# Closed loop recycling pilots

# UPM Formi recycling case: Closed loop recycling for service trays at ABC service stations



Old serving trays made of high-strength plastic replaced by new, sustainably manufactured trays in closed loop system.

1. Recycling of the old trays
2. Designing of new trays by Magisso
3. Production of new trays by Wiitta by using UPM Formi
4. Delivery of trays by Meira Nova
5. Collection at the end of lifecycle and recycling back into renewable granulates ready to be used for new trays by Kuusankoski

[Link to promo video in YouTube](#)





# UPM ProFi recycling case: Take back pilot

- Purpose: establish take back process for off cuts and old decks for installers and customers to ensure a complete circular economy for UPM ProFi deck boards
  - Installers and other customers can bring their off cuts to branches where they are collected
    - ➔ save costs for disposal
- 1st step: Collect off cuts of UPM deck boards at branches and get them back to be used for production
  - Installers and other customers can bring their off cuts to branches where they are collected
- 2nd step: actual end of life recycling
  - Bring back used deck boards



Seit 2020 ist UPM ProFi Teil der europäischen Circular Plastics Alliance und unterstützt damit die Bemühungen, eine nachhaltige Kreislaufwirtschaft weiter voran zu treiben.



made in GERMANY



In nächsten großen Schritt werden in diesem Jahr das Pilotprojekt zur Materialrücknahme in Zusammenarbeit mit verschiedenen UPM ProFi-Händlern in Deutschland.

Ziel dieses Pilotprojekts ist es, Endkunden und Handwerker die Möglichkeit zu geben, Dielenabschnitte, die bei jeder Installation eines UPM ProFi Terrassenbaus entstehen, einer umweltfreundlichen Wiederverwertung zuzuführen.

Die Kunden haben die Möglichkeit ihre Dielenabschnitte ihren Händlern in speziell dafür vorgesehenen Rücknahmepunkten kostenfrei abzugeben. UPM ProFi hat mit dem Händlern ein Rücknahmeverfahren der Saison vereinbart.

Das geht nicht nur Kunden und Zapf allen Beteiligten, sondern hilft insbesondere der Umwelt, die die Dielenabschnitte wieder dem Produktzyklus zuführen werden. Somit verbleibt der eingesparte Papier- und Plastikabfall dauerhaft in der nachhaltigen UPM ProFi-Kreislaufwirtschaft.



www.upmprofi.de





# Thank you!

Contact us via

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