



RE-duce



RE-use



RE-cycle

**Expert talk**  
Mass balancing according  
to ISCC PLUS: Drop-in  
solutions towards full  
circularity!



# Who is presenting today?



**Jimena Ruesta**  
Strategy Sustainability & Portfolio Enabling  
Covestro Deutschland AG



**Dr. Peter Hawighorst**  
Program Management  
ISCC System GmbH



# INTRODUCTION TO ISCC PLUS AND MASS BALANCING IN THE CHEMICAL INDUSTRY



# ISCC is a well-established and credible certification standard



The ISCC System is governed by the ISCC Association, a diversified multi-stakeholder non-profit organization with currently almost 180 members





Depending on the market, system users can apply the ISCC EU, ISCC PLUS or ISCC CORSIA certification scheme

## ISCC EU



- Applicable for **sustainable fuels used in the European Union**
- **Recognised by the European Commission** to demonstrate compliance with the EU's sustainability criteria for biofuels set out in the RED\*

## ISCC PLUS



- Application for **voluntary** and certain **regulated markets**
  - Energy and biofuels outside the European Union (e.g. Japan, Australia)
  - **Industrial applications**
  - Food and feed markets

## ISCC CORSIA



- Applicable for **Sustainable Aviation Fuels under ICAO CORSIA**
- To **demonstrate compliance** with the sustainability and GHG criteria for CORSIA eligible fuels

\* The recognition of voluntary schemes by the European Commission in the framework of the RED II is pending (as of 5 July 2021)

# ISCC certifies all kinds of **agricultural and forestry raw materials** for industrial applications

## Examples



Soy



Canola



Palm



Sunflower



Cereals



Corn



Sugarcane



Sugarbeet



Wood



Cotton



Shea Nuts



Camelina



In addition, ISCC is the leading system for the certification of **waste and residue-** based supply chains



Corn



Canola

Bio



Sugarcane



Cotton



Tall Oil



UCO

Bio-circular



Forestry residues



Straw



Mixed Plastic Waste



End-of-life tires

Circular (technical)



Waste textiles



CO<sub>2</sub> (post-industrial)

Examples



Power-to-Gas

Renewable



Power-to-Liquid



For the certification of **agricultural raw materials**, the standard developed a balanced set of ecological and social criteria



**Principle 1:** Protection of biodiverse and carbon rich areas



**Principle 2:** Good Agricultural Practice



**Principle 3:** Safe Working Conditions



**Principle 4:** Compliance with Human, Labour and Land rights

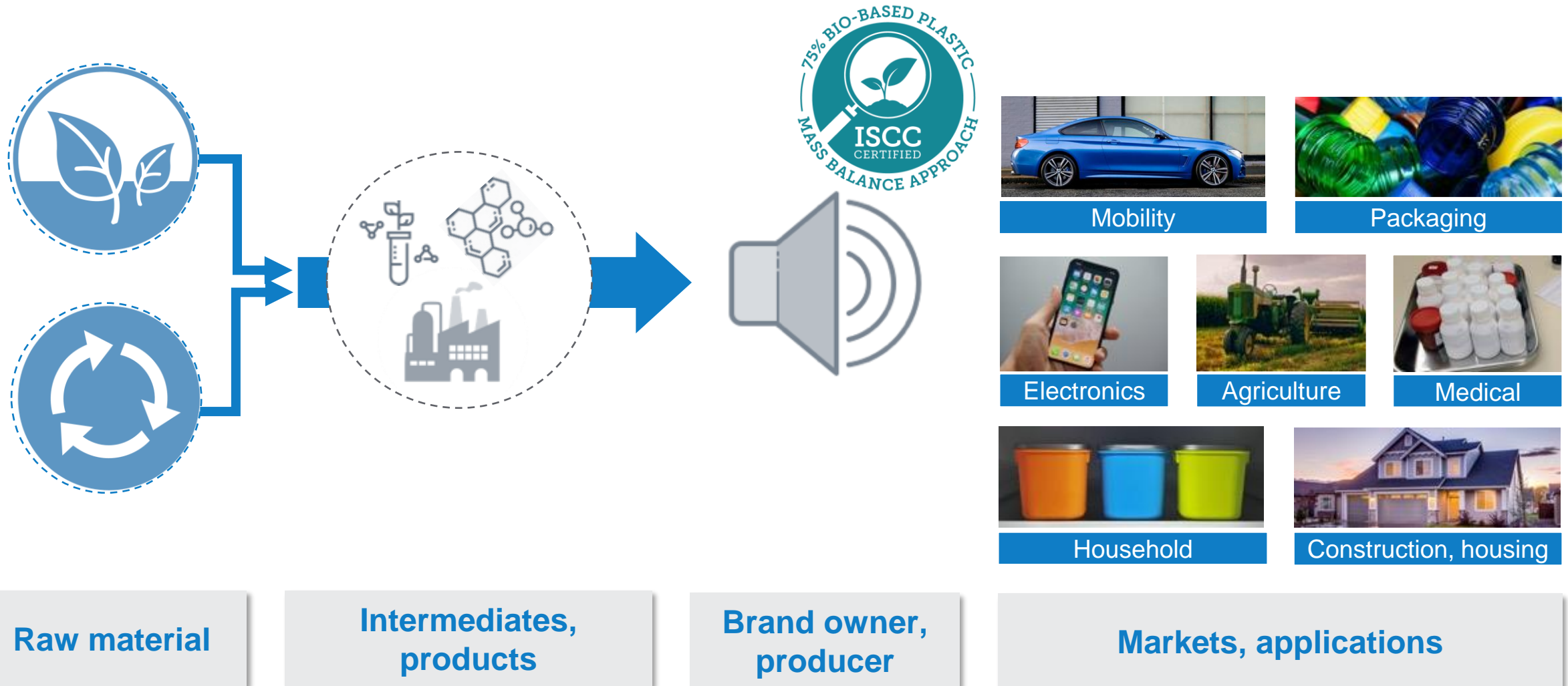


**Principle 5:** Compliance with Laws and International Treaties



**Principle 6:** Good Management Practices and Continuous Improvement

# ISCC PLUS offers solutions for the *circular* economy and *bioeconomy*

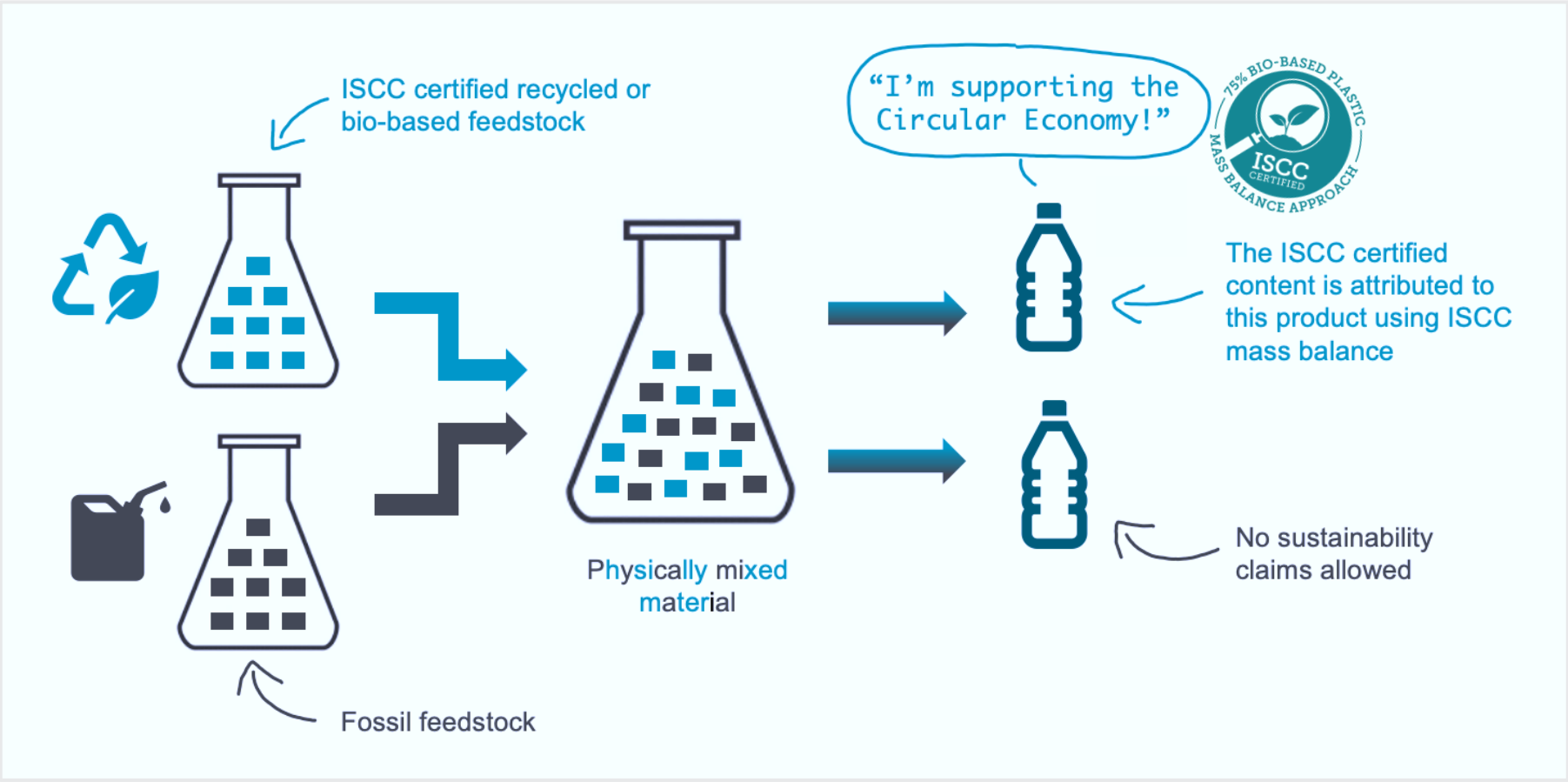




Several drivers push the growth of the *bioeconomy* and *circular economy*. This poses challenges, but also opens up new potentials



# The application of the mass balance approach enables companies to scale up circular and bio shares in an economical and efficient manner



Mass balancing is a method to document and track circular/bio-based content through complex manufacturing systems.



By using mass balance, companies can track how much circular/bio-based material has been used in their manufacturing systems and balance it out exactly with the certified content in the end products.



# ISCC PLUS Certification globally stands for



Robust global multi-stakeholder system



Supply chain traceability



High level sustainability



Raw material identity



Transparent mass balancing rules



Clear chain of custody rules



Credible and verified claims



# RE SERIES: DROP IN SOLUTIONS TOWARDS FULL CIRCULARITY



# Covestro's approach to sustainability



We will become fully circular.

Long-term strategic program

Focus on  
**Four sustainability pillars**



**Alternative raw materials**



**Innovative recycling**



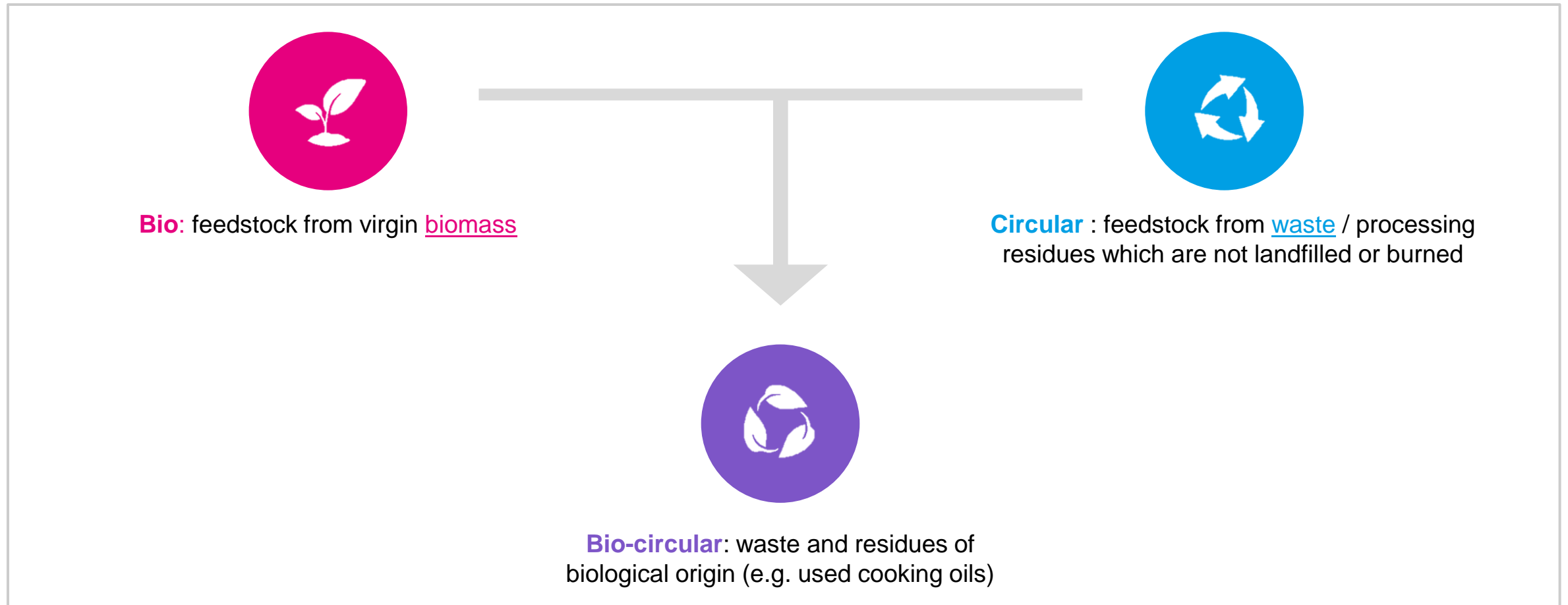
**Joint solutions**



**Renewable energy**

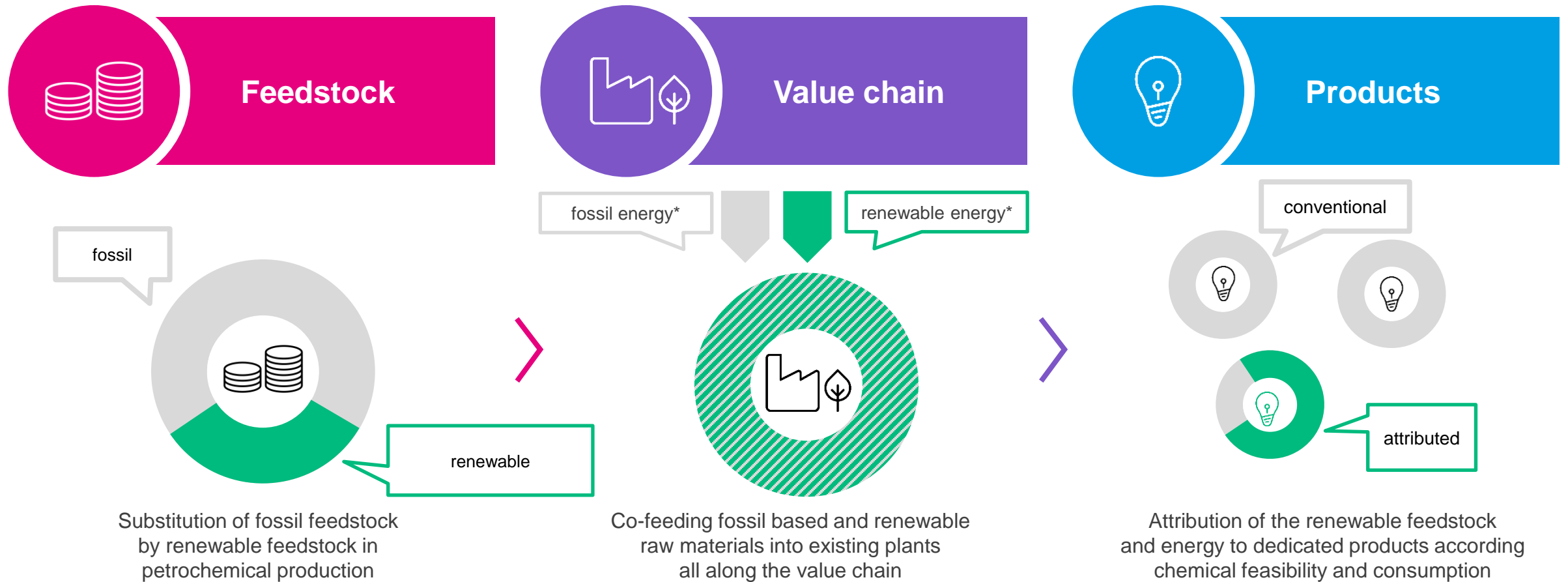
# Alternative raw materials are introduced into the value chain

Raw material categories defined by ISCC PLUS standard





# Energy complements principle of mass balance approach



\* Energy is allocated directly to the process and according ISCC PLUS to renewable raw materials.

Illustration based on Nova institute



# Makrolon® RE

The **physical, mechanical, thermal, optical, weathering and processing properties** of Makrolon® RE resin are **identical** to conventional Makrolon® resin.

COVESTRO product stewards





# Equivalency verified by Covestro



Makrolon® RE resins are **Identical** to conventional Makrolon® resins\*

You can **replace an existing** Makrolon®  
with its correspondent Makrolon® RE

	Raw Material Specification	Resin Production Process	Product Formulation	Product Specification
 <b>Makrolon®</b>	✓	✓	✓	✓
 <b>Makrolon® RE</b>	✓	✓	✓	✓

\* Product and quality equivalency confirmed under actual production conditions for representative product

# A crucial step to reach sustainability goals

Alternative raw materials can already be introduced

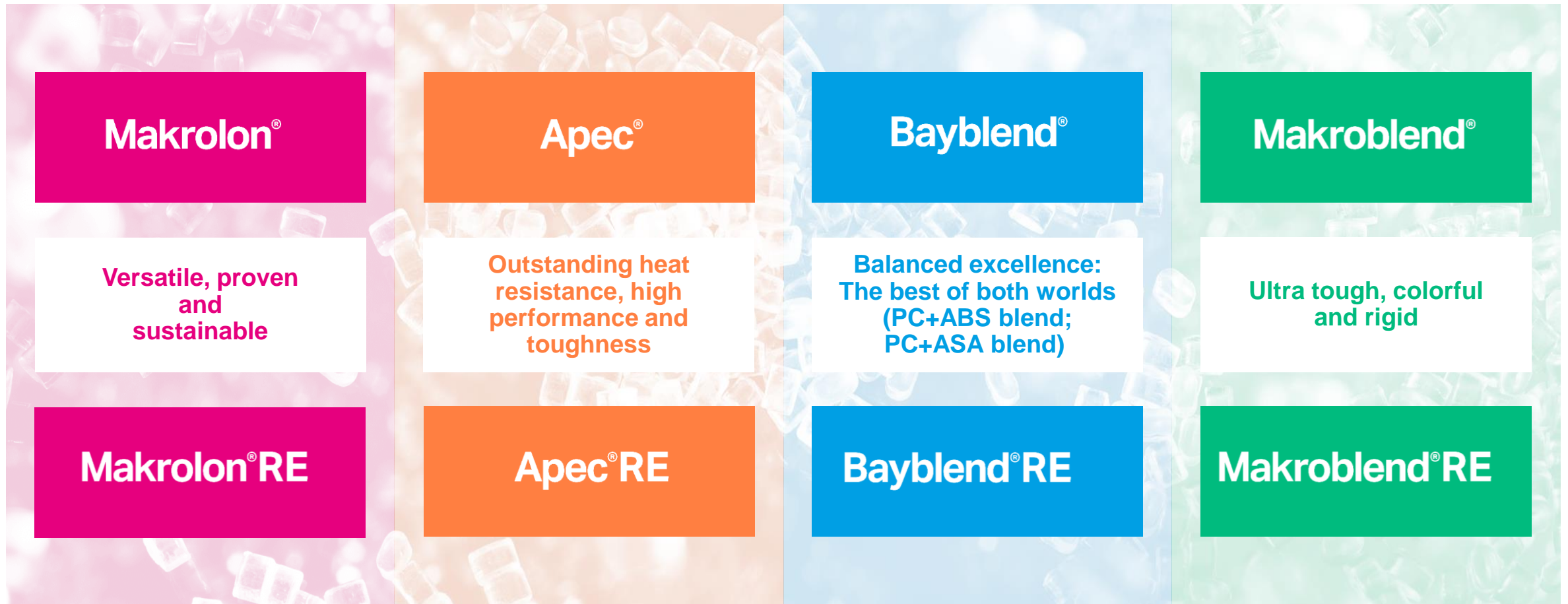




# Building a drop-in portfolio based on ISCC PLUS certified feedstock



The suffix allows you to identify the mass balanced drop-in products



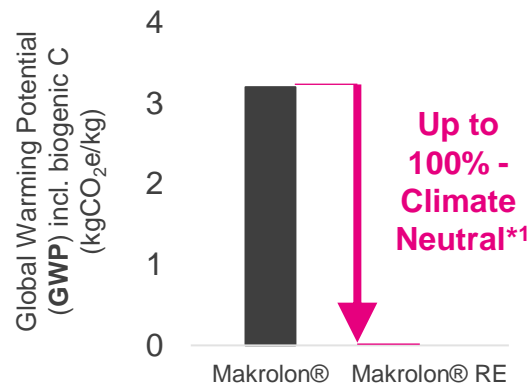
# Environmental benefits of RE series



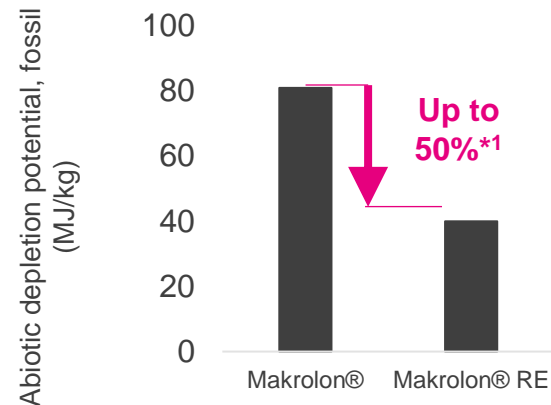
Low Carbon Footprint Polycarbonate saves fossil resources by use of alternative raw materials.



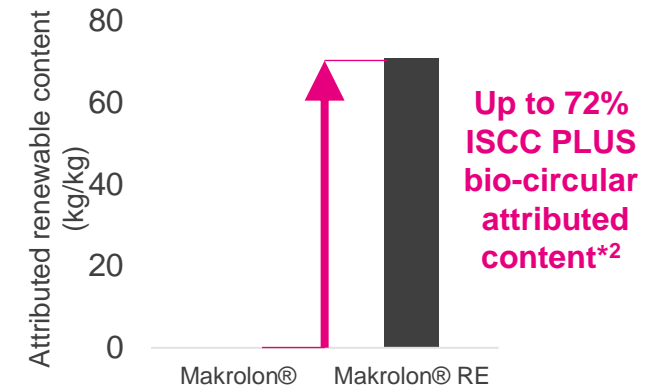
Climate contribution:  
Lower Carbon Footprint



Preserving resources:  
Lower fossil resource depletion



Use of alternative  
raw material



\* Specific product savings differ according product properties. Shown values represent planned selected Makrolon RE grades.

1 LCA calculation acc. to ISO 14040/14044 critical review by TÜV Rheinland with preliminary value chain data, cradle to gate, biogenic carbon included, impact assessment acc. to CML 2001 - Aug.2016.

2 According ISCC PLUS sustainability declaration via mass balance.



# ISCC provides frame conditions for the right claims

Potential logos for a value chain\*\*



**Makrolon®RE**

Up to  
**72%\***



20...  
**72%\***



HEADLAMP  
COVER

e.g.  
**~60%**



\* Depending on the product, 72% is the currently maximum sustainable share for Polycarbonates by replacing key raw materials and without use of free allocation

\*\* Assuming value chain partners are accordingly ISCC certified / licensed. ISCC stands for International Sustainability and Carbon Certification, \*\*\* PC Mono-material headlamp as reference  
Each value chain partner is solely responsible for his own claims, sustainable share allocation and alignment with ISCC for the use of logo.

E.g. [ISCC 208 Logos and Claims \(iscc-system.org\)](https://www.iscc-system.org/), Information about how to become ISCC PLUS certified [link](#), [link](#)



## INTRODUCING THE WORLD'S FIRST

# CLIMATE-NEUTRAL POLYCARBONATES

- With zero carbon footprint from cradle to gate,\* thanks to the introduction of raw materials from mass-balanced bio-waste and residues and use of renewable energy.

\*Cradle to gate is an assessment of a partial production life cycle from resource extraction to the factory gate, biogenic carbon included. According LCA reviewed by TÜV Rheinland, preliminary value chain data, impact assessment according to CML 2001 - Aug.2016.







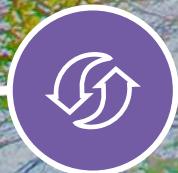
# Thank you for your attention

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RE-duce



RE-use



RE-cycle