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TDK

ISCC PLUS Certification

Global sustainability certification system

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ISCC and Environmental Impact

ISCC International Sustainability & Carbon Certification

ISCC is **a global sustainability certification system** that offers solutions for the implementation and certification of sustainable, deforestation-free and traceable supply chains of agricultural, forestry, waste and residue raw materials, non-bio renewables and recycled carbon materials and fuels.

ISCC operates different certification systems for different markets (Please, have a look to the table).

Images from the official ISCC web site: Sustainable Development Goals – ISCC System (iscc-system.org)

ISCC PLUS and Environmental Impact

ISCC EU

It can be applied to demonstrate compliance with the legal requirements of the Renewable Energy Directive 2009/28/EC modified by Directive (EU) 2015/1513 (RED), and Directive 2009/30/EC on fuel quality modified by Directive (EU 2015/1513 (FQD)2 for all Member States of the European Union.

ISCC PLUS

The certification system applicable to all markets that are not regulated by the RED and FQD (for example, food, feed, chemical/technical product markets or bio-energy markets outside the European Union). This system covers the same requirements as the ISCC EU, but can be customized by applying additional voluntary plugins.

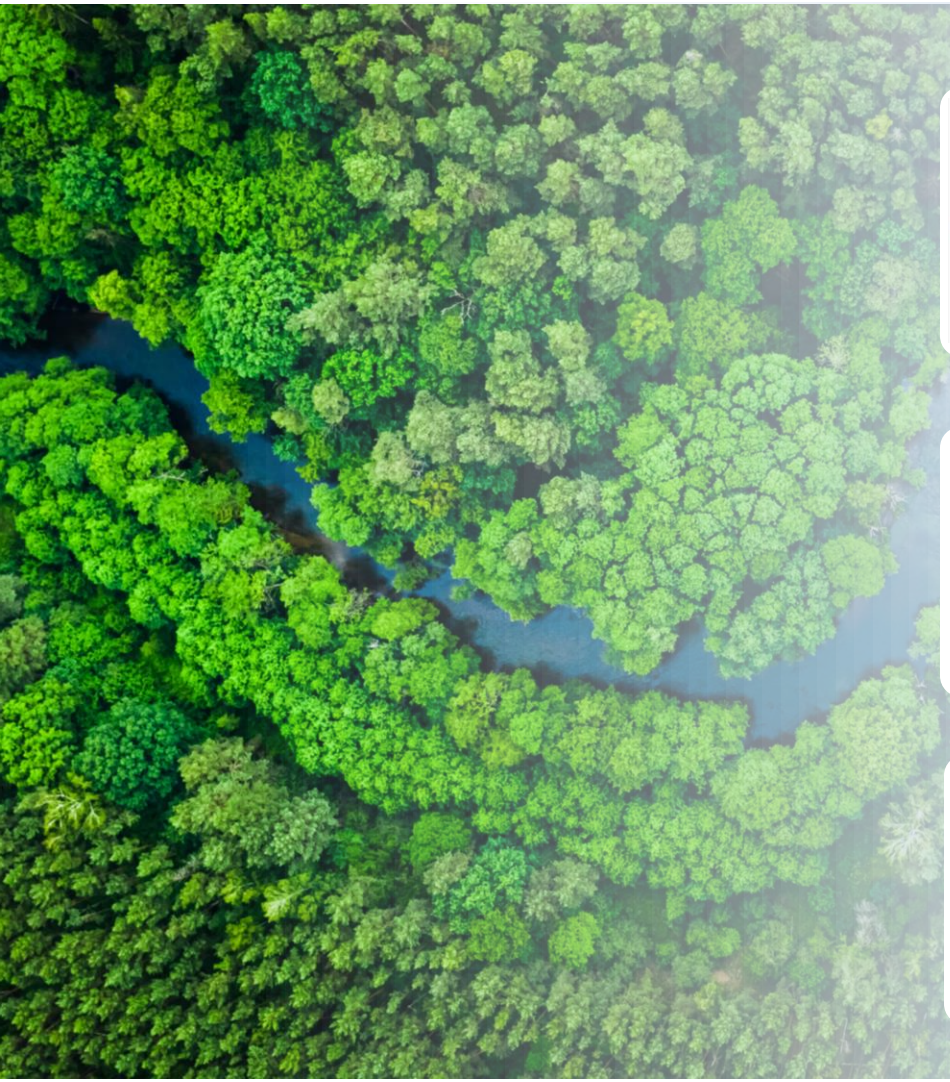
Image from the official ISCC web site: Sustainable Development Goals – ISCC System (iscc-system.org)

ISCC's Objectives

- ✓ Implementing social and ecological sustainability criteria
- ✓ Monitoring deforestation-free supply chains
- ✓ Avoiding conversion of biodiverse grassland
- ✓ Calculating and reducing GHG emissions
- ✓ **Establishing traceability in global supply chains**

  - Traceability throughout the supply chain enables each player to source sustainable products from any certificate holder. For this reason, **all relevant elements of the supply chain must obtain a certificate in order to handle sustainable materials.**

ISCC PLUS Categories



Products linked to bio materials: Bio materials are virgin agricultural raw materials bio based. Agro based feedstock **1st generation** (eg. sugarcane)

Products linked to bio-circular materials: Bio-circular materials are made from biological waste and residues from agricultura, forestry and related industries. Waste and residues **2nd generation** (eg. used cooking oil).

Products linked to circular materials: Circular feedstocks are materials of non biological origin that are derived from mechanical or chemical recyclying (e.g. mixed plastic waste).

Raw materials are used under ISCC PLUS

Images from the official ISCC presentation: 10_ISCC_TCNA081122_ISCCPLUShenke.pdf (iscc-system.org)

Mass Balance Approach for ISCC

Since chemically recycled or bio-based feedstocks are typically blended in the production process, physical segregation of recycled content is often practically and economically infeasible. **The mass balance approach makes it possible to track the amount and sustainability characteristics of circular and/or bio-based content in the value chain and attribute it based on verifiable bookkeeping.**

With the mass balance concept, you gradually replace fossil-based materials with circular and/or bio-based materials. Production is done in a more sustainable way combining alternative feedstock with fossil-based feedstock. Mass balance is a way of keeping track of the renewable quantities and allocating them to specific products.

"Free attribution" of the sustainable share to one or several outputs

IMPORTANT!!

It isn't possible to guarantee how many renewable raw material each product contains but ***we can guarantee that you are supporting sustainable sourcing of*** **circular and/or bio-based** ***materials.***

Graphic based on that of the corresponding page: ISCC PLUS bei NUDEC, Kreislaufwirtschaft von Kunststoff

Innovative Bio-Circular Film Implemented on PEC HP Capacitors

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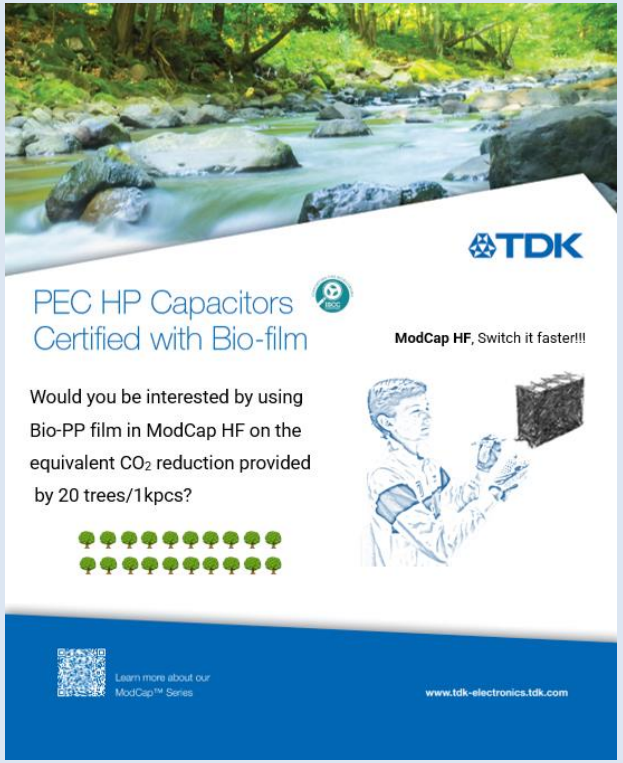

This bio-circular film, which already implemented of the ModCap series capacitors, constitutes a reduction provided by 23 trees*.

1st certified sustainable capacitors with bio-circular BOPP

*Study conducted under specific conditions

Borealis Polyolefins based on ISCC PLUS Certified Feedstock

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- ✓ All Bornewables™ polyolefins are ISCC PLUS certified
- ✓ In the production, mass balance approach is used to save an identical volume of fossil feedstock by replacing it with sustainable feedstock
- ✓ Their use provides a reduced carbon footprint to the end-product and contributes to the circular economy.


Polypropylene

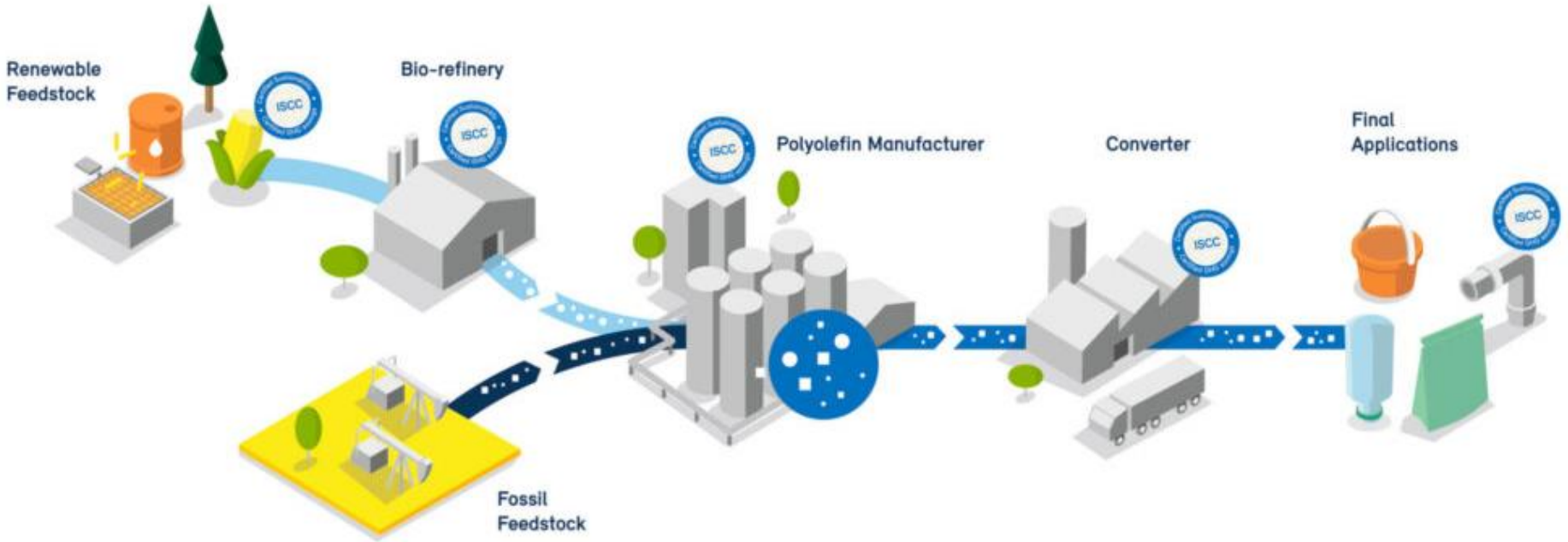

Image from the official Borealis page: Mass Balance Model (borealisdigitalstudio.com)

Borealis Polyolefins based on ISCC PLUS Certified Feedstock

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Reduction of greenhouse gas emissions

- ✓ Life-cycle assessment (LCA) conducted by **IFEU Heidelberg** has shown that the Bornewables™ polyolefins provide significantly lower greenhouse gas emissions compared to ones made from fossil-based feedstock.

- ✓ Monitoring deforestation-free supply chains for Bornewables™ PP, when compared to PP manufactured with fossil-based feedstock, it revealed that from cradle-to-gate, the **partial carbon footprint is reduced by at least 2.1 kgCO2 eq/kg polymer,** from 1.6 to -0.5 kgCO2 eq/kg, a reduction of at least 120%.

Jindal BOPP Base Film based on ISCC PLUS Certified Feedstock

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Commercially available feedstock options from Borealis:

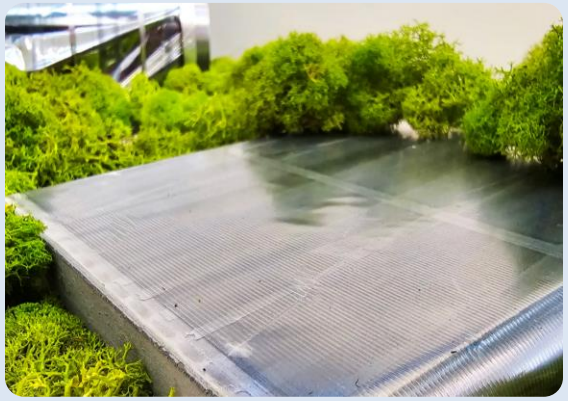
1st generation: Agro based feedstock

- Leads to alternative land use
- Raises fundamental ethical questions (competition with food crops which can increases food prices)

This isn't compliant with Borealis ethical principles and/or understanding of sustainability

2nd generation: Waste and residue streams-based feedstock

- No competition with food production
- Lower environmental footprint than fossil equivalent
- Feedstock availability (HVO biodiesel is expected to increase due to regulatory incentives)



BOPP base film:

- These films, without any compromise on their performance, offer a bio based or chemically recycled post-consumer waste certified content to customers.
- Jindal Film has presented different ISSC PLUS certified PP possibilities by 2nd ISCC PLUS category:

Products linked to bio-circular materials: Bio-circular materials are made from biological waste and residues from agricultura, forestry and related industries. Waste and residues **2nd generation** (eg. used cooking oil).

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