

paint**istanbul** **TURKCOAT** CONGRESS

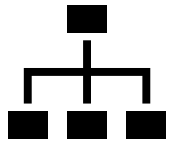
**Leveraging Life Cycle Assessment to Drive Sustainability in the
Coating Industry**

Anastasia Gkika

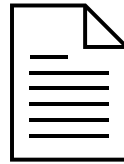
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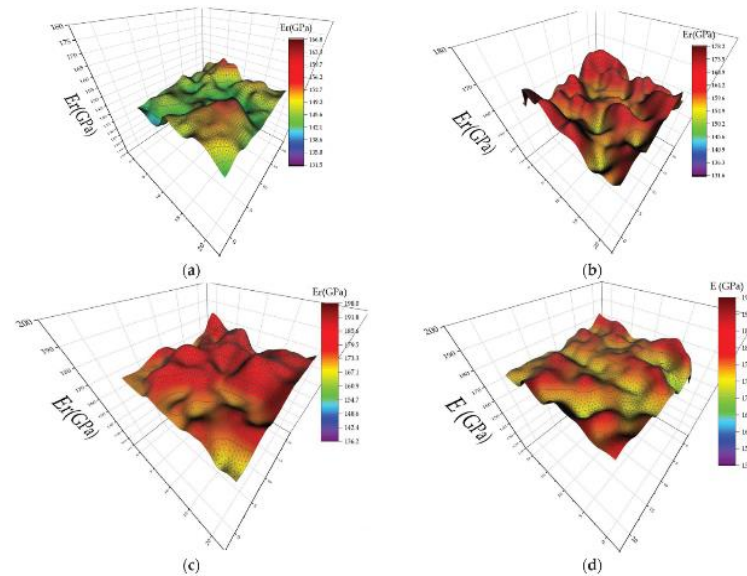


Fields of Services & IRES Technical Groups

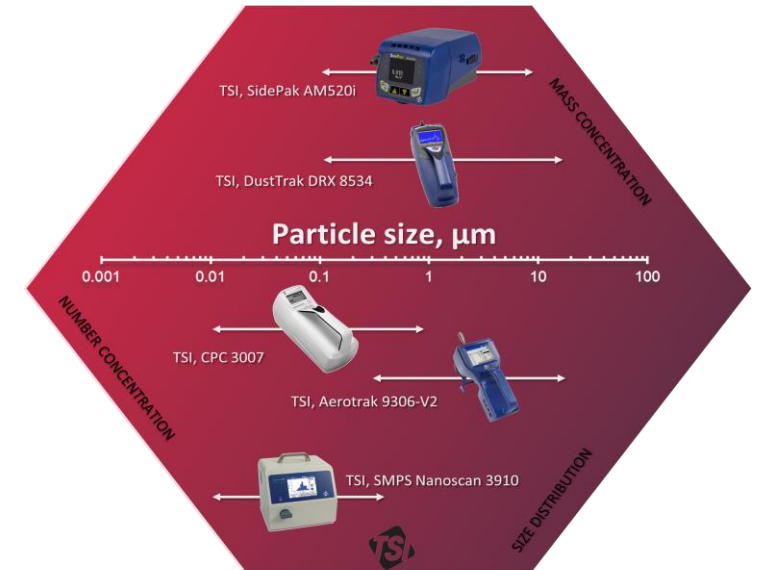
Sustainability & Circularity



Data Science & Materials Science Digitization



Risk & (Nano)Safety



Sustainability & Circularity Group Activities

Environmental footprint

- Life cycle assessment quantifies the potential environmental impacts throughout a product's life cycle from raw material acquisition to final disposal (ISO14040&14044:2006)
- Product Carbon Footprint (ISO14067:2018)
- GHG emission quantification and reporting (ISO14064-1:2018)

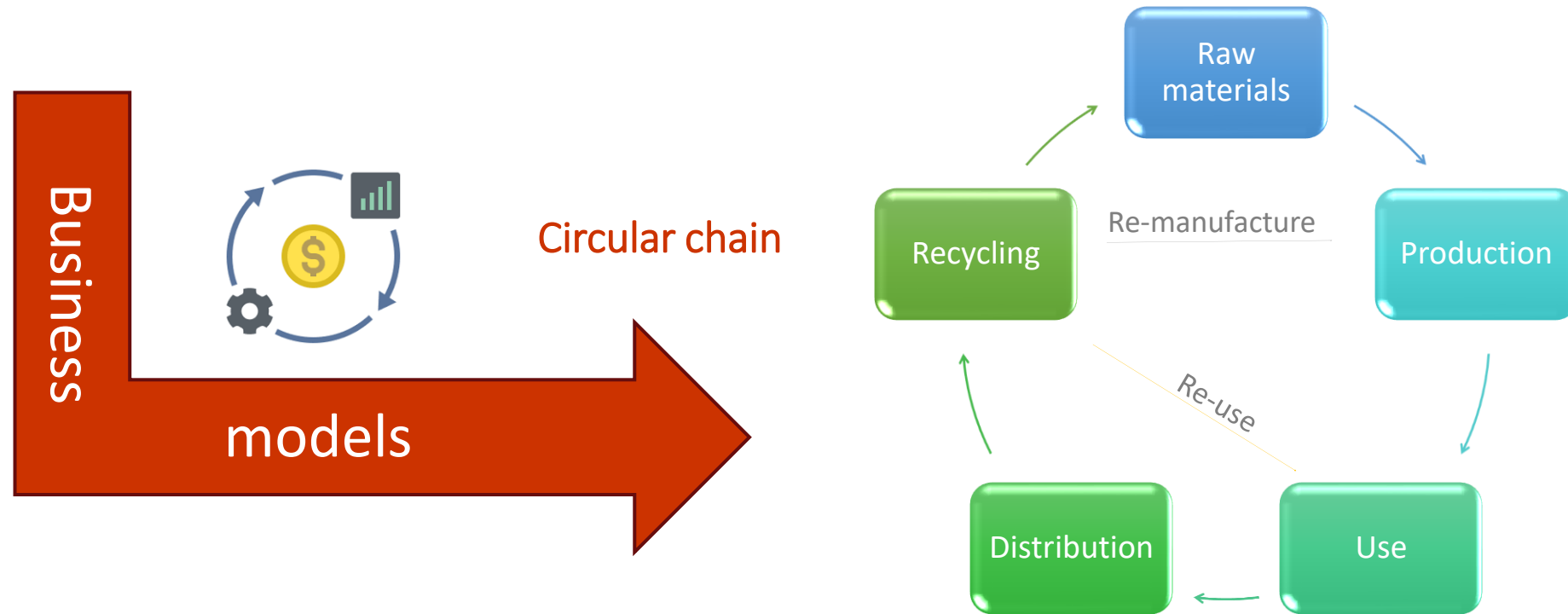
Cost Analysis

- Life cycle cost assessment calculates the total cost of a product or service incurred over its entire life cycle and identifies all 'hot spots' (ISO15686-5:2017)

Eco-design

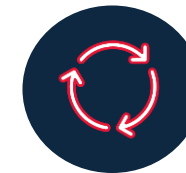
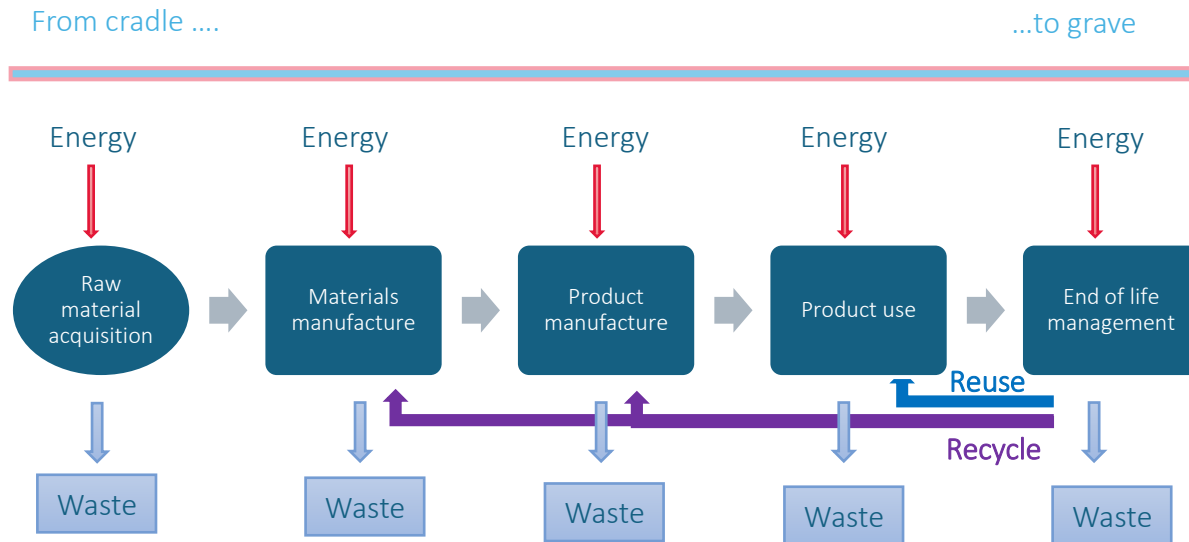
- Implement and incorporate environmental aspects as an integral part of a product's design and development (ISO14006:2020)

Circular Economy Transformation



Why LCA matters for the Coating Industry

- Environmental regulations (e.g., REACH, VOC directives, ECHA) are tightening (i.e. PFAS-free coatings)
- Stakeholders demand **transparent**, science-based **sustainability claims**
- LCA helps identify **hotspots**, **reduce** impacts, and support **eco-design**



From “cradle-to-grave”

Life Cycle Assessment (LCA):

Maps out material and energy flows to assess life cycle environmental impacts and provide recommendations to stakeholders.

Industry-Specific Challenges Addressed by LCA

- High **Volatile Organic Compounds** content in solvent-based systems
- **Fossil-based** raw materials (resins, pigments)
- **Energy-intensive** production processes (spraying, drying)
- **Packaging and transportation** emissions
- **End-of-life** impacts (e.g., incineration, paint residues)



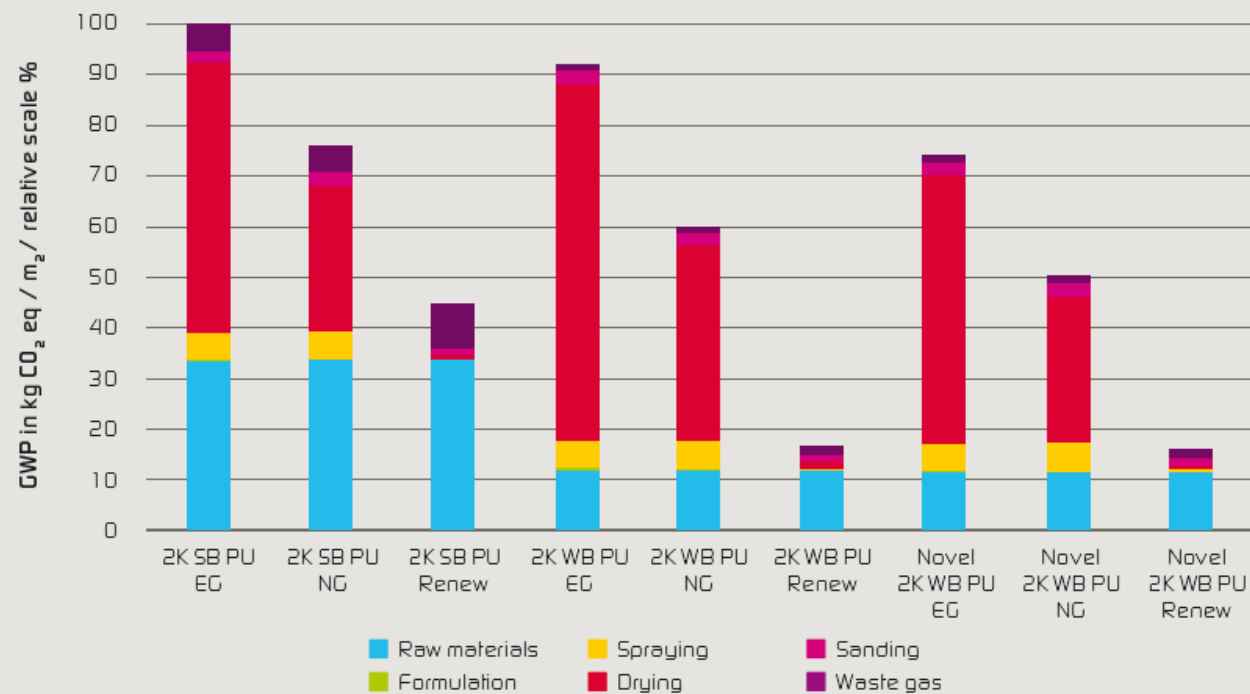
How LCA Drives Decisions

- **Formulation choices:** Comparing water-based vs. solvent-based paints
- **Raw material substitution:** Evaluating bio-based vs. petrochemical resins
- **Energy optimization:** Identifying stages with high energy demand
- **Packaging innovation:** Light-weighting, recycling-friendly materials



Example: LCA study on Wood Coatings

Figure 4: Influence of thermal energy source in the carbon footprint per m² wood surface coated with clear-coat (EG: electrical grid / NG: steam from natural gas / Renew: wind power).



LCA Results

Process parameters like the energy source type used for drying or the nature of the raw materials have a strong impact on the LCA

Source: Life cycle assessment study on wood coatings, Dr. Berta Vega Sánchez, Daniel Steinke & Dr. Karolin Schenk, Covestro Deutschland AG, Germany, Dr. Eva Tejada Rosales, Covestro S.L., Spain, and Dr. Sven A. Thomsen, Hesse GmbH & Co. KG, Germany. Published in European Coatings journal, 01-2021

LCA and Market Differentiations

- **Eco-labels** (e.g., EU Ecolabel, Green Seal) require LCA inputs to verify environmental performance
- **Environmental Product Declarations (EPDs)**, based on ISO14025 and derived from LCA add credibility in B2B procurement and green building certifications (e.g., LEED, BREEAM)
- **Carbon footprint labeling** and LCA-backed claims (e.g., "low carbon coating") help brands differentiate in sustainability-conscious markets
- **Innovation focus:** LCA insights guide R&D to focus on materials and processes that improve environmental performance

Our Role in Advancing Sustainability in the Coating Industry

- We partner with **coating manufacturers** and **suppliers** to integrate sustainable practices across product development, sourcing, and production.
- We **conduct cradle-to-grave LCAs** to identify environmental hotspots and guide eco-design improvements in coating formulations and application processes.
- We **help clients navigate global regulations** (e.g., REACH, Green Seal, Ecolabels) and achieve third-party sustainability certifications.
- We **work with companies** to measure, report, and reduce greenhouse gas emissions related to coatings production and use.
- We **assist in evaluating and transitioning** to bio-based, low-VOC, and non-toxic raw materials without compromising performance.

Thank you



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