



How to Design Interiors with Innovative Circular and low carbon solutions?

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MobilityScience™

This is Dow

MobilityScience™

2024 NET SALES
\$43B

EMPLOYEES
~36,000

MANUFACTURING SITES
91

GLOBAL REACH
in which Dow manufactures products in
31 countries

Our Ambition
Be the most innovative, customer-centric, inclusive and sustainable materials science company in the world.

Global, fully back-integrated supplier

- Silicones
- Polydefln elastomers
- Polyurethanes
- Acrylics
- Specialty chemicals

Customized development

Experience and support

DOW
MobilityScience™

Leading technology

Sustainability



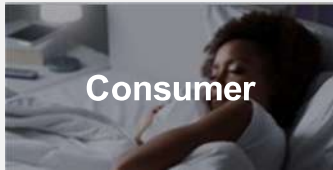
Market Verticals



Packaging



Infrastructure



Consumer



Mobility

Key Growth Drivers

- Circular and renewable
 - Societal food waste reduction
 - Downgauging/lightweighting
-
- Decarbonization of electricity
 - Building efficiency
 - Longevity
 - Connectivity
-
- Safer materials
 - High-efficiency end products
 - Circular and renewable
-
- Electrification
 - Autonomous driving
 - Lightweighting
 - Circularity and renewable
 - Reduced noise, vibration

Dow Participation Highlights



Packaging to enable freshness en route and on the shelf



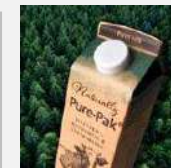
Elastomers, fluids, composites and silicones enabling wind and solar power



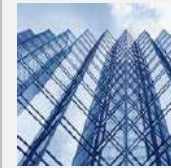
Recycling of end-of-life consumer products into raw materials for re-use



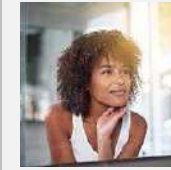
Silicones, urethanes, and acrylics together enable weight reduction, safety, and improved efficiency



Packaging solutions made with bio-based feedstocks



Materials that enhance the efficiency of high-performance buildings

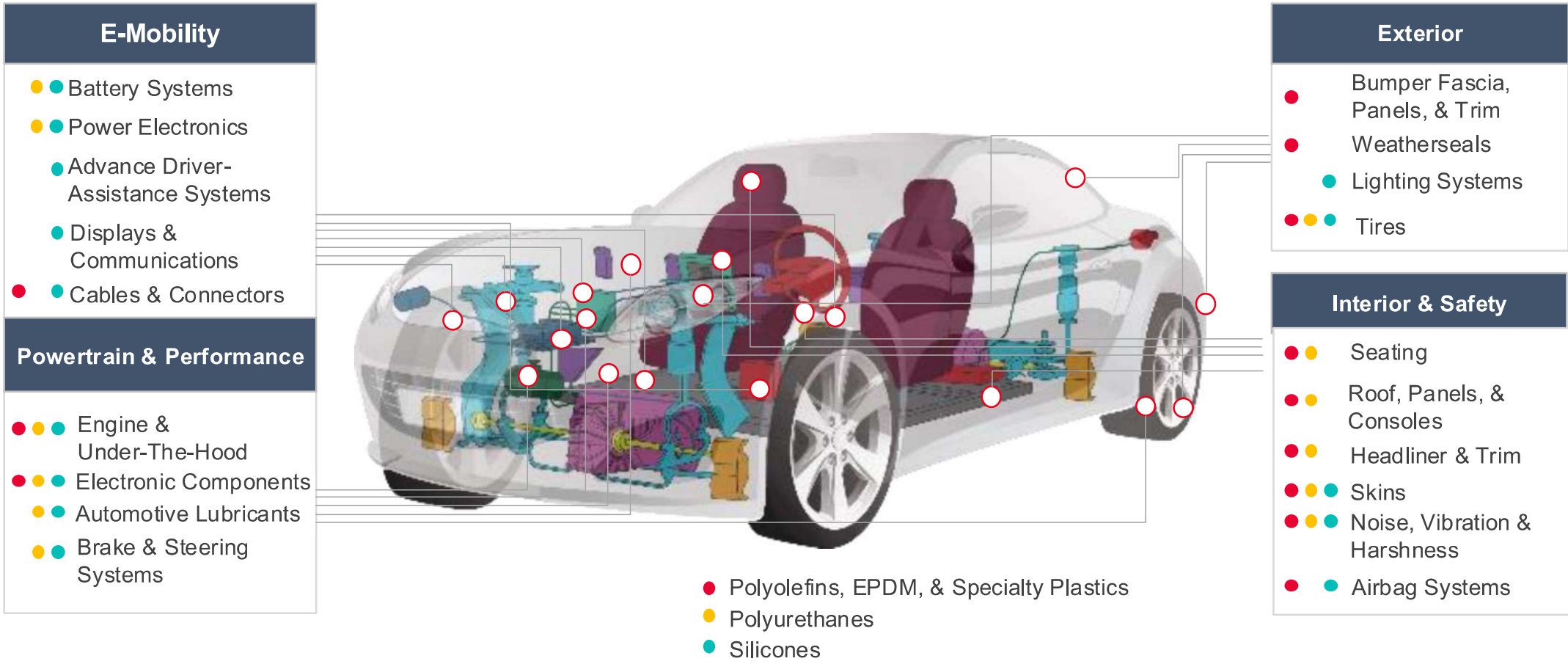


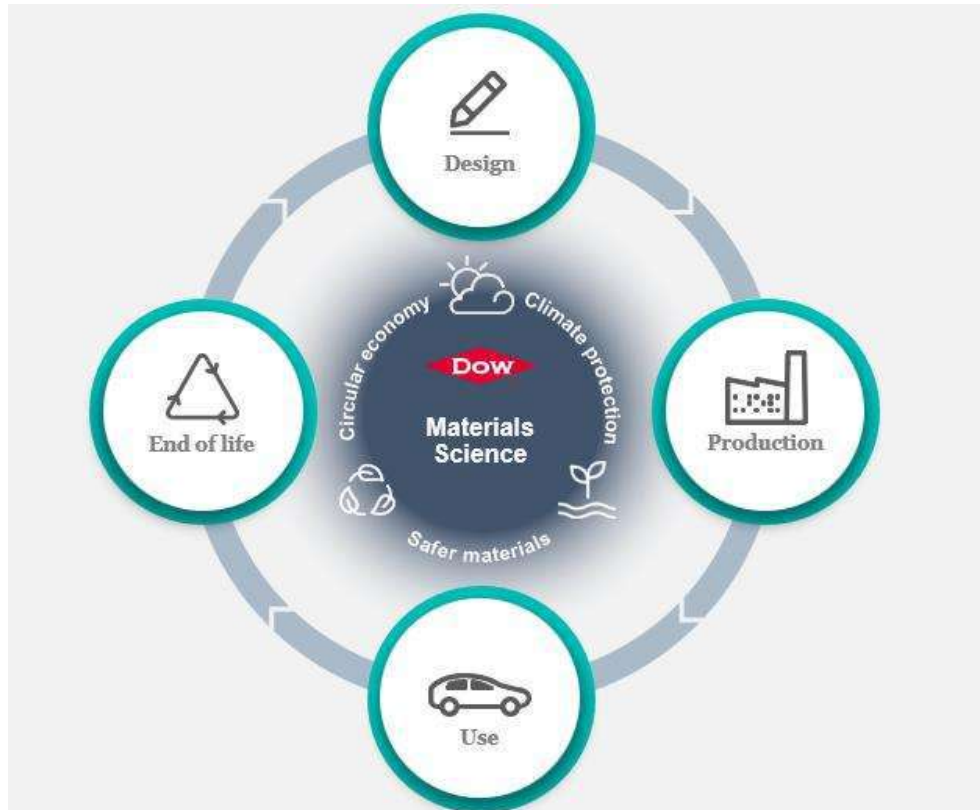
Bio-based home and personal care ingredients



Battery assembly materials for safe and reliable EV & AV designs

Material Innovations Across Broad Application Spaces





Minimize Carbon Emissions

- Enable vehicle lightweighting
- Optimize supply chains (local sourcing)
- Transition to lower carbon footprint materials
- Comply with regulations + meet customer expectations



Advance Circularity

- Design for recyclability with end-of-life considerations
- Incorporate recycled materials (both mechanically, and through advanced chemical processes)



Develop Safer Materials

- Focus on reliability, efficiency and performance
- Ensure low VOC and minimal odors



Optimizing Our Manufacturing Facilities and Processes for Sustainability



Increasing Use of Clean Energy and Steam



Investing in Transformative, Next-Generation Manufacturing Technology



Developing Low-Carbon Products and Services



Building a Value-Generating Scope 3 Decarbonization Pathway

Reducing Product Carbon Footprint of Polyols by:

- Investing in projects to decarbonize cracker and transition to renewable power → Scope 1&2
- Utilizing alternative raw materials → Scope 3
- Working on End-of-Life → Circularity
- Maximizing decarbonization to progressively reduce PCF in polyols **up to 50% NOW! - DECARBIA**

Our carbon reduction strategy includes all three carbon emissions scopes.

SCOPE 1

Emissions directly under our control from our own operations

SCOPE 2

Emissions caused indirectly from the generation of power and steam we purchase from third parties

SCOPE 3

Emissions we are indirectly responsible for – upstream from the products or services we buy from suppliers, and downstream from the transportation, usage and end of life of our sold products

Decarbonization to a **Low carbon polyol**



Decarbonization of Scope 1, 2 and 3

New Vehicles

SPECFLEX™ DEC polyol produced with low carbon technologies to reduce product carbon footprint.

Polyurethane (PU)

Skins, foams, headliner, trims, instrument panel foams, acoustics / NVH (hoodliners, roofliners, e-motor encapsulations, acoustic barriers)



Powered by Dow's Carbon Footprint Ledger (CFL)



Lowering the GWP vs baseline

Up to 50% PCF reduction vs baseline**



Identical performance to virgin material:

No requalification needed



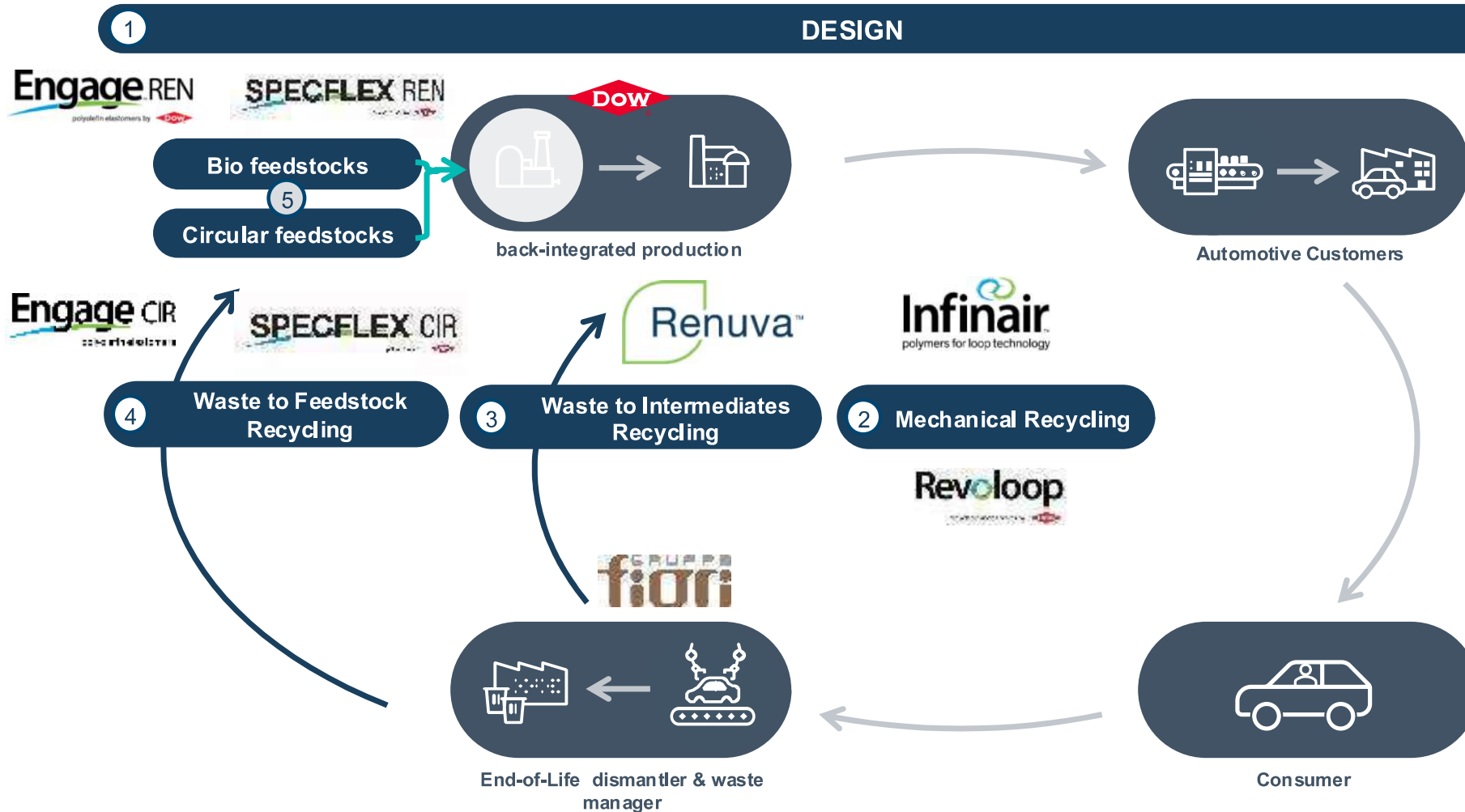
Helping OEMs to achieve their scope 3 targets



*3rd party validation

** PCF internally calculated following ISO14044/67

Building the ecosystem for automotive circularity together



① Design for Circularity Recycling Automotive Materials at End of Life

1.

Explore **new materials** in the design

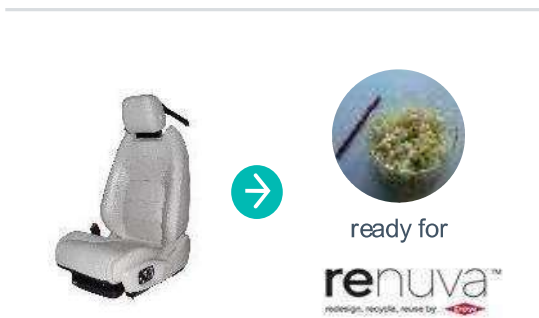
E.g. Simpler compounds for mechanical recycling



2.

Enable circularity for **existing materials from design to end of life**

E.g. Chemical recycling of seating foams



3.

Design the **systems** around the material to be easy to dismantle for repair or recover

E.g. With detachable / debondable adhesives in tires and battery packs



Image Source: A2MAC1

RECOVERY OF PU AUTO WASTE WITHOUT DISASSEMBLY

Collaboration delivers novel process to recover polyurethane foam from end-of-life vehicles, driving critical progress toward closed-loop circularity for the automotive industry

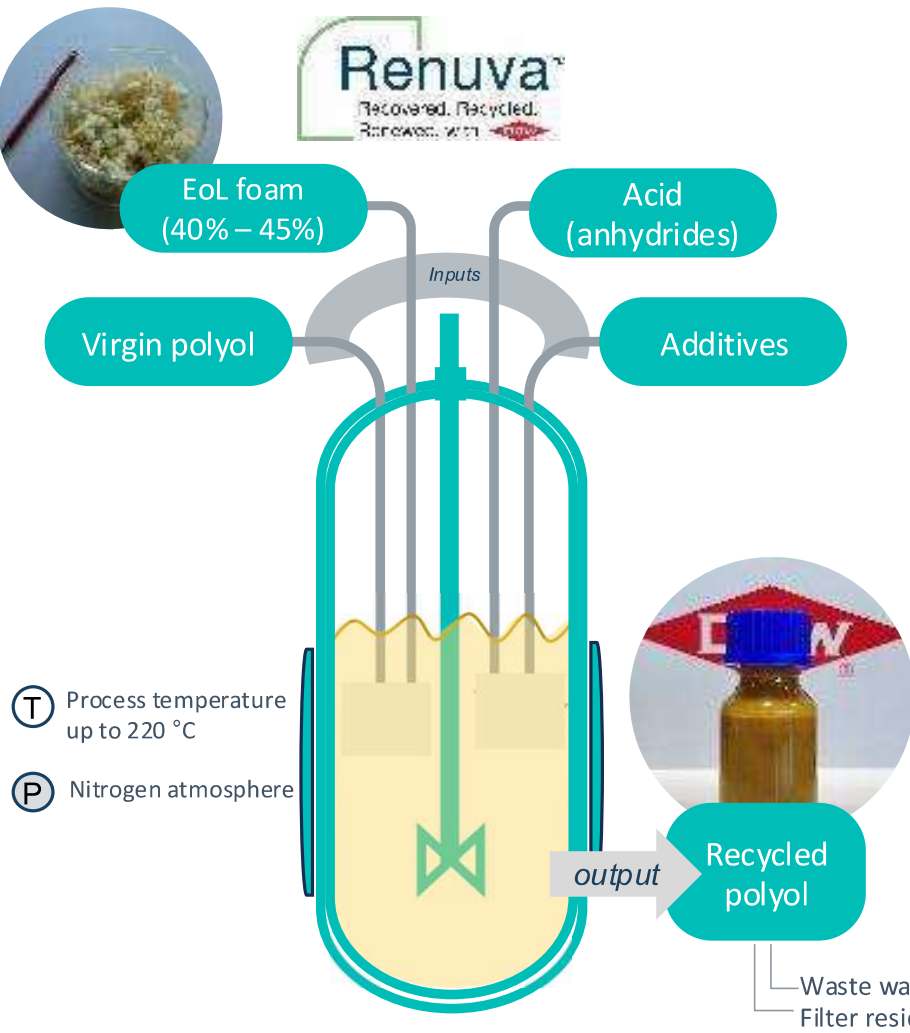
- **Dow** in partnership with **Gruppo Fiori**, announced the latest advancements in a jointly-developed, novel process that enables recovery of polyurethane waste from end-of-life vehicles **without** disassembly.
- Traditional recycling of vehicles, however, requires disassembly of automotive components, creating cost and complexity for recyclers.
- Dow and Gruppo Fiori's innovation eliminates this step, producing a simplified recovery for PU waste stream with the purity needed to enable depolymerization (chemical recycling).



Renuva™
Recovered. Recycled.
Renewed. with Dow



Waste to Intermediates Recycling: Production Process



- Recycling polyurethane foam from end-of-life cars into RENUVA™ Polyols, helps significantly reduce environmental impact.
- Any type of flexible polyurethane (PU) foam can be recycled (limited pre-sorting of conventional, memory, and high-resilience foams needed)
- A result of this reaction is a liquid polyol - RENUVA™ polyol, which contains up to 50% of recycled content.



Industrial scale production of Chemically recycled monomers



More than 10% closed loop content in the final foam depending on the final formulation



Meeting OEMs requirements
Enabling complex molded technologies



RENUVA™ process leads to a significant CO₂ reduction compared to the standard polyol production



①③ Waste to Intermediates Recycling



Renuva™ Mobility
Close-loop
Recycling Program



Recycling polyurethane foam from end-of-life cars and turning it into RENUVA™ polyols, for a significant reduction in the environmental footprint

Polyurethane foams (PU)
Seating, Acoustic, Instrument panel
TDI and MDI based



Need of a Collaborative ecosystem comprising of various value chain partners



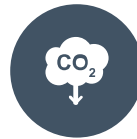
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Enabling complex molded technologies



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Circular Feedstock



Seek Together™

End-of-Life Vehicle Waste

SPECFLEX™ CIR uses recycled waste from the automotive industry to produce circular polyurethane-based products matching the same original performance



First example of PU circularity in mobility segment



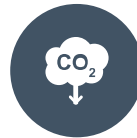
Circular feedstock using waste stream from the same mobility sector



Enabling **> 75% circularity on polyol** and **> 60% on MDI***
> 95% in POE



Identical performance to virgin material:
No requalification needed

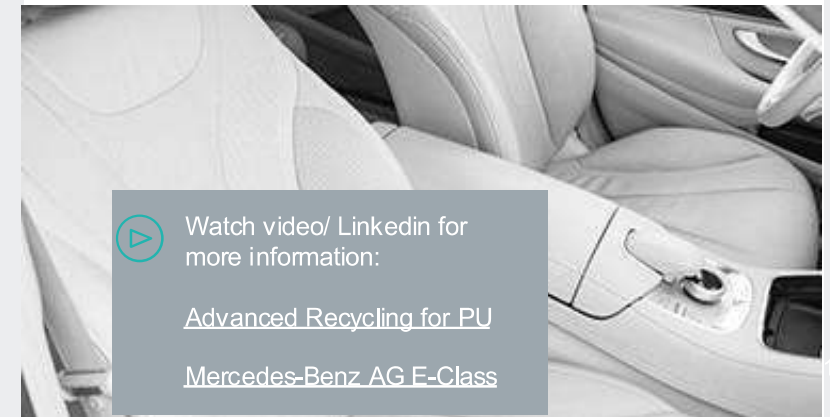


Enabling **CO2 reduction** versus virgin fossil fuel-based equivalent

New Vehicles

Polyurethane (PU)

Skins, foams, headliner, trims, instrument panel foams, acoustics / NVH (hoodliners, roofliners, e-motor encapsulations, acoustic barriers)



Watch video/ LinkedIn for more information:

[Advanced Recycling for PU](#)

[Mercedes-Benz AG E-Class](#)

*MDI: Methylene diphenyl diisocyanate

Circularity attribution based on mass balance

Turning circularity into reality

Prioritizing circularity in the design phase is key to ensuring final OEM's circularity objectives are successfully met.



Ecosystem Development

New ecosystem design is required to facilitate simple vehicle parts dismantling at end-of-life.



Collaboration

Facilitated by collaboration and engagement with OEMs and new ecosystem partners (dismantlers, recyclers).



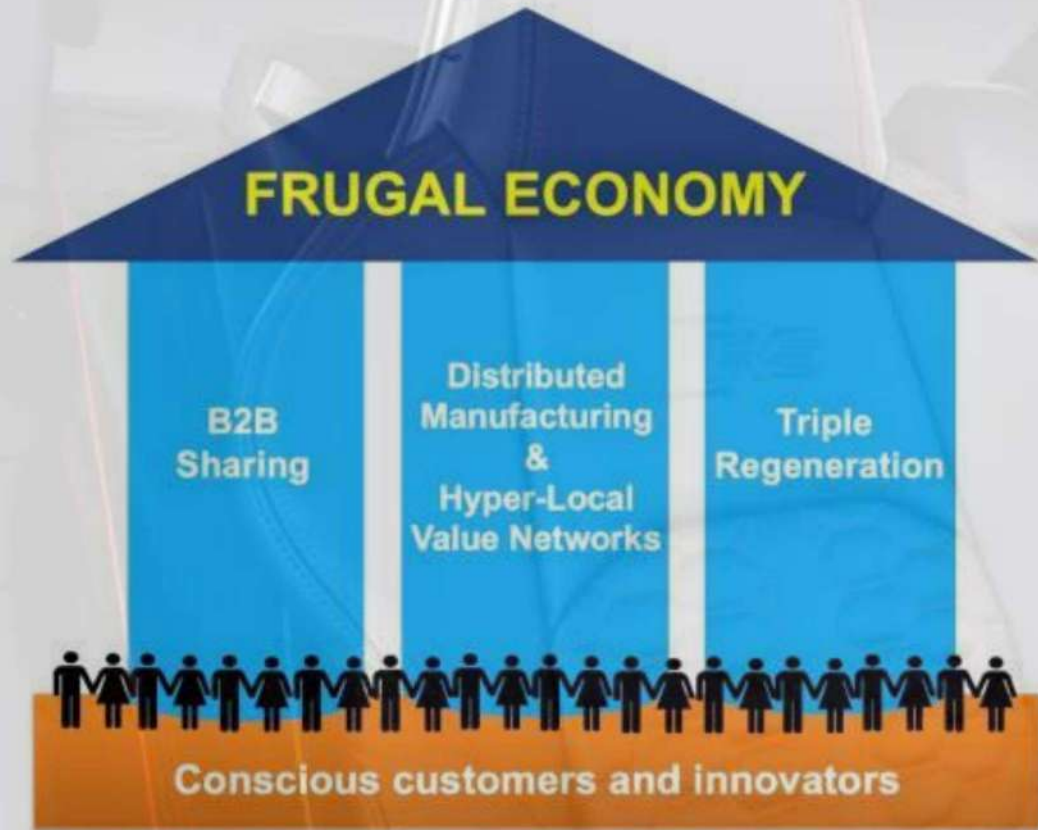
Investment

Sustained investment and committed advocacy guide industry choices and creates momentum to scale circular solutions for ELV.

Materials science is a critical enabler in helping the Mobility industry advance its sustainability objectives.



'DOING BETTER WITH LESS'



Source: Navi Radjou



Thank You



Mobility | Dow Inc.