Transitioning Toward a

CIRCULAR ECONOMY

for Automotive Plastics and Polymer Composites

The transition toward a circular economy for industrial goods will require the automotive industry and its suppliers to rethink the ways that vehicles and their materials are designed, constructed, used, and handled at end of life. The automotive plastics and polymer composites industry stands ready to work together and with automakers, shredders, recyclers, research organizations, and governments to conduct the strategic, whole-value-chain thinking and coordination that it will take to make this transition a reality.

A circular economy is designed to **keep resources in use for as long as practicable** by extracting maximum value from them while in use and recovering and reusing materials at the end of each service life.

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Environmental benefits

Longer product lifetimes

$400-600 billion
business opportunity for automotive companies and their suppliers

Automakers are making **public commitments to circularity**

Challenges facing traditional automotive recycling are creating the opportunity to reimagine it

Legislation abroad explicitly restricts the use of materials that are not recyclable in vehicles

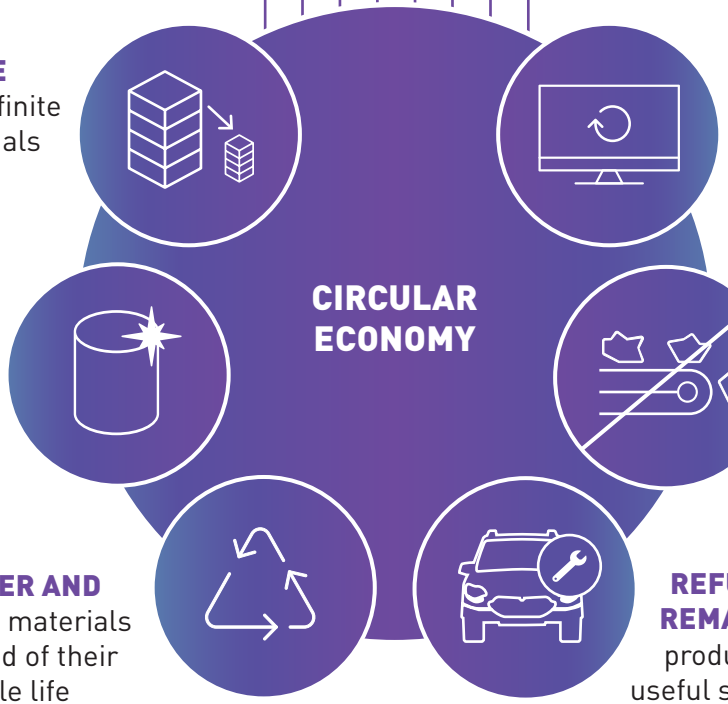
Growing demand for mobility as a service requires more durable products with longer lifetimes

Domestic legislation at the state level is beginning to place responsibility for recyclability on the manufacturer

Increasing vehicle electronic content will shift the automotive industry to a **consumer electronics mindset**

Decreasing capacity for handling materials at end of life is driving the need for additional options

Growing **consumer sentiment against single-use plastics** could extend to engineered plastics



REDUCE demand for finite raw materials

DESIGN materials, products, and systems to be circular (e.g., design for disassembly and recovery)

REUSE recovered materials in new products

ELIMINATE in-process scrap production

RECOVER AND RECYCLE materials at the end of their usable life

REFURBISH AND REMANUFACTURE products to extend useful service lifecycles

PROGRESS TOWARD A CIRCULAR ECONOMY FOR AUTOMOTIVE PLASTICS AND POLYMER COMPOSITES

Repurposing **plastic waste and recyclates** into automotive materials and parts

- Molded engine components
- **Roofs** and **rear seat structure**
- **Front-end carrier** prototypes
- **Textiles**

Using **renewable feedstock** in plastics and polymer composites

- **Plant-based oils**
- **Naturally occurring fibers** (e.g., sugarcane, cellulose, soy, wheat straw, rice hulls, kenaf fiber)

Advancing **materials separation and cleaning** technologies

- Better **solvents and additives** for washing plastics
- **Tracing materials** to facilitate automated infrared sorting

Designing plastics and systems for **longevity, recyclability, and disassembly**

- **UV stabilizers**
- High-performance **resins**, **additives**, and **compatibilization** technologies

Developing **advanced recycling technologies**

- **At least 60 organizations** currently working to scale up **depolymerization**, **pyrolysis**, and **other emerging methods** for plastic processing

Optimizing manufacturing processes to improve efficiency

- **Thin wall instrument panels**
- **Blow-molded air ducts**
- **Mono-material headlamps**

Investigating the **viability of automotive plastics recovery models**

- **Recovery from bumper fascia**
- **Recovery from battery cases**
- Participating in **supply "web"**

Funding R&D for circular economy solutions

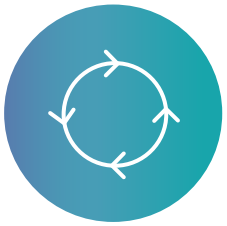
- **Alliance to End Plastic Waste** targeting to invest $1.5 billion
- **IACMI** projects on circularity
- **DOE**: $35 million (REMADE), $25 million (BOTTLE), others

THE PATH FORWARD

Continue to develop **ADVANCED RECYCLING AND RECOVERY** technologies

Invest in a robust and coordinated **RECYCLING INFRASTRUCTURE**

Design high-quality automotive plastics for **EASIER DISASSEMBLY, REFURBISHMENT/ REUSE, AND RECYCLING**



Conduct **RIGOROUS LIFECYCLE ASSESSMENTS** of circular plastics and polymer composites

Explore **NEW BUSINESS MODELS** that enable profitable circularity

American Chemistry Council | Plastics Division

Download the report: www.automotiveplastics.com