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.

- **Environmental benefits**
  - **Longer product lifetimes**
    - $400-600 billion business opportunity for automotive companies and their suppliers

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

**Reduce** demand for finite raw materials

**Reuse** recovered materials in new products

**Recycle** and recover materials at the end of their usable life

**Refurbish and remanufacture** products to extend useful service lifecycles

**Eliminate** in-process scrap production

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

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

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

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

**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

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

**Increasing vehicle electronic content** will shift the automotive industry to a consumer electronics mindset
**PROGRESS TOWARD A CIRCULAR ECONOMY FOR AUTOMOTIVE PLASTICS AND POLYMER COMPOSITES**

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**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**

1. **Continue to develop ADVANCED RECYCLING AND RECOVERY technologies**
2. **Invest in a robust and coordinated RECYCLING INFRASTRUCTURE**
3. **Design high-quality automotive plastics for EASIER DISASSEMBLY, REFURBISHMENT/REUSE, AND RECYCLING**
4. **Conduct RIGOROUS LIFECYCLE ASSESSMENTS of circular plastics and polymer composites**
5. **Explore NEW BUSINESS MODELS that enable profitable circularity**

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