#### 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

Automakers are making **public** commitments to circularity

**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

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

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

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

#### **REDUCE**

demand for finite raw materials

**REUSE** recovered

materials in new

products

CIRCULAR ECONOMY



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



**ELIMINATE** inprocess 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

- ightarrow 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



Download the report: www.automotiveplastics.com