Automotive Industry’s Road to Emissions and Waste Reduction; Today and Tomorrow

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Introduction

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Pollution Prevention Initiatives by the Automotive Industry

Examples of Pollution Prevention in the Automotive Supply Chain

The following graph shows that automotive suppliers reported implementing over 200 new source reduction activities in 2014. Many of these facilities also provided descriptive information about their pollution prevention efforts. Samples of the types of entries you can find in the TRI P2 Search tool are listed below.

### Examples of Pollution Prevention Activities Initiated by Automotive Suppliers

- **Gasoline Engine and Engine Parts**
  - Surface Preparation and Finishing
  - Cleaning and Degreasing
  - Inventory Control
  - Raw Material Modifications
  - Good Operating Practices
  - Product Modifications
  - Spill and Leak Prevention

- **Electrical and Electronic Equipment**
  - Process Modifications

- **Steering and Suspension Components**
  - Process Modifications

- **Brake System**
  - Process Modifications

- **Transmission and Power Train Parts**
  - Process Modifications

- **Seating and Interior Trim**
  - Process Modifications

- **Metal Stamping**
  - Process Modifications

Not shown: Other Motor Vehicle Parts Manufacturing
TRI Releases in the Automotive Industry

TRI Waste Managed and Releases per Motor Vehicle Produced, 2005–2015

Click on legend items below to customize items displayed in the chart
- TRI Waste Managed Per Vehicle
- TRI Releases per Vehicle

Notes: 1) Quantities per vehicle are calculated by dividing the automotive manufacturing sector’s annual waste managed and releases, respectively, by U.S. vehicle production. Automotive manufacturing sectors include: Motor Vehicle Manufacturing (NAICS 3361), Motor Vehicle Body and Trailer Manufacturing (NAICS 3362), and Motor Vehicle Parts Manufacturing (NAICS 3363). 2) Managed waste quantities include release quantities.

Era Has Been Managing Chemicals for Facilities, Including the Automotive Industry
(30+ industries for 25 years)
ERA has extensive experience in tracking chemical/materials in large automotive plants.

Electric Vehicles are being manufactured at Automotive plants.

Some of these facilities have **Battery Plants** as part of the Assembly plant.
Use of Dip Tanks
Great transfer efficiency (100%) No waste!!
Reuse of Purge Solvents
(Material Reuse)
(Reduction of material usage)
Zero Landfill Waste (for the Entire Facility Operations)

2017 GM Landfill-Free sites

• Waste paper and cardboard to recycling
• Liquid hazardous waste to cement kiln as fuel
• General trash to waste-to-energy burner (steam production for energy)
• Batteries, halide lamps and fluorescent bulbs to recycling
• Aluminum cans and engine plant aluminum to trading and recycling. Reuse internal at the plant
• Plastics, Composites, and Elastomers
Packaging Waste

A lot of waste is generated from packaging
Reduction in packaging waste by incorporating re-useable/returnable containers
   (totes, pallets, drums, etc.)
Practices regarding packaging has to be reviewed and reassessed
Reduce Packaging Weight
Increase Part Density (packing parts more tightly)
Coordination with Suppliers
Treasure Hunts for Energy Use Reduction
(solar, windfarms, EV’s...etc.)
SmartWay Global Freight Supply Chain Programs

Global Green Freight Action Plan

Using EPA Smartway for Logistics (Emission reduction from the supply chain)
Using Car Share programs for employees
(Providing transportation to automotive plants)
Biodiversity programs at facilities
Planting of clover (reduction of water consumption, GHG emissions, and providing flowers for pollinators)
EV Sales Are Growing with a Lot More Models Being Offered to the Consumer
New Era of Chemicals to be Tracked

The materials making up our “traditional” vehicles are changing with EV’s

- Non-Ferrous Metals: 8%
- Electrical Parts: 1%
- Fluids: 1%
- Plastics: 2%
- Carpets: 9%
- Process Polymers: 1%
- Tires: 3%
- Rubber: 1%
- Glass: 1%
- Battery: 1%
- Other: 1%
- Ferrous Metal: 68%
Era’s Program Can Track Battery Components, Battery Packs Etc.

<table>
<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td>Anode (-)</td>
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<tr>
<td>Cathode (+)</td>
</tr>
<tr>
<td>Electrolyte</td>
</tr>
<tr>
<td>Metals</td>
</tr>
<tr>
<td>Composite (Plastic Housing)</td>
</tr>
<tr>
<td>Coolant</td>
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<tr>
<td>Control Module</td>
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</tbody>
</table>
Total Battery Tracking Workflow

- **Cell Manufactures**
  - SDS
    - Cathode
    - Anode
    - Electrolyte
    - Insulator
    - Tabs/Poles
- **Battery Pack Assembly**
  - SDS/ Part NO./Passport
    - Pack/Array Housing
    - Cells
    - Cables
    - BMS
    - Emergency Battery Disconnect Switch
    - Battery Base & Cover
    - Sealers
    - Coolant
- **Battery Use**
  - Vehicle Assembly
- **Tracking**
  - In Service/Use
    - In Repair
  - Damaged
    - Dis-positioned
  - Second Use
  - Recycle for Reuse
  - Recycle to Low Grade Metal

**Data Flow**
- **Cell Number** Tied to **Battery Identifier** Tied to **VIN**
  - Break Down Tied to **Cell Number**

**Global Passport**