



**ROE** – *Recycled Original Equipment*®

# **ELECTRIC VEHICLES & THE FUTURE CHALLENGES FOR AUTO RECYCLERS**

*Jonathan Morrow, ARA Past President*



*For over **75 years**, the Automotive Recyclers Association (ARA) has represented professional automotive recyclers, a vibrant and thriving part of the automotive supply chain. ARA's mission is to advance the automotive recycling industry and promote its beneficial effects on society. ARA and its members are dedicated to the efficient removal and re-utilization of Recycled Original Equipment™ – which are genuine recycled original equipment™ manufactured (OEM) automotive parts – and the safe disposal of inoperable motor vehicles.*

*Automotive recyclers process over 12 million vehicles per year, making automobiles the most recycled item in the U.S. The automotive recycling industry is the 16th largest in the U.S., valued at an estimated \$32 billion dollars annually. Automotive recycling businesses employ over 140,000 people at more than 9,000 locations around the country.*



## Why Choose Recycled Auto Parts?

### Value

Automotive recyclers supply retail and wholesale customers with quality auto parts that cost 20 percent to 80 percent less than comparable new automobile parts.

### Quality

Professional auto recyclers use robust quality control procedures to reclaim and sell only those parts that are in good condition and meet industry standards. Reputable auto recyclers guarantee their parts with warranties, too.

### Environment

Automobiles are among the most recycled products in the world. By choosing recycled auto parts, you help preserve natural resources, reduce air and water pollution and divert material from landfills.

### Simplicity

If you want to start using recycled parts for repairs on your own vehicle, just ask your mechanic or repair shop. They'll find the right part for your vehicle through a network of professional auto recyclers.

# REUSE the Purest Form of Recycling

- Increasing battery recycling removes harmful products from landfill
- Conservation of natural resources
- Prevent pollution
- Saves energy
- Good for the environment and our planet
- Reduces impact on climate change
- Reduces risk in our industry



# Shifting Paradigm of Automotive Recycling

Professional automotive recyclers are experiencing rapid shifts on an all-encompassing level, from business model, data integrity, acquiring inventory, customer expectations and more. The industry's response to these challenges are determining its future

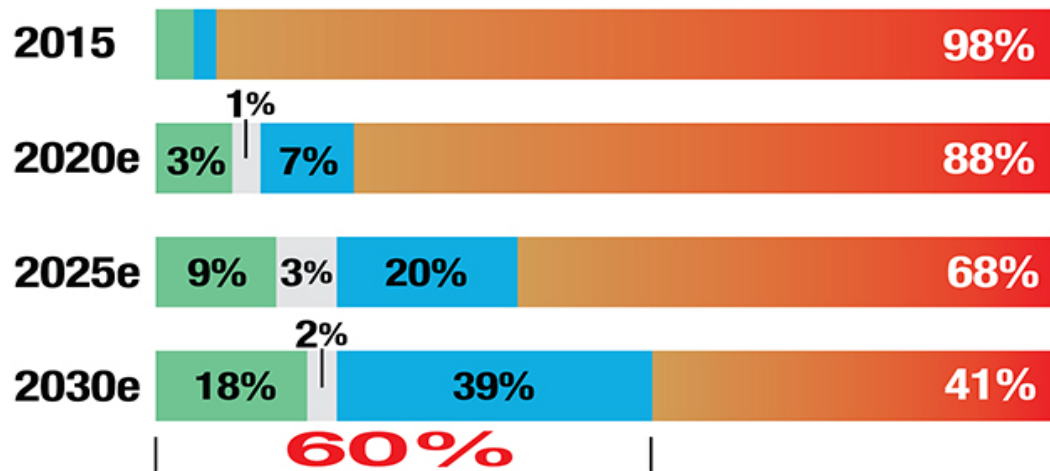


# EV Ownership will Increase



- The volume of vehicles is only going to increase.
- Second use will bring revenue to the value chain
- Training and development - grow skills, knowledge and experience
- Increase professional standards in the industry
- Become a specialist.
- Standing on the sidelines is not an option any more
- Find New ways to do our 'old' business.

## By 2030 (in 11 yrs) EVs and Hybrids will account for 60% of all global vehicle sales



Source:  
JP MORGAN  
ESTIMATES



BEV  
BATTERY  
ELECTRIC  
VEHICLE

PHEV  
PLUG-IN HYBRID  
ELECTRIC  
VEHICLE

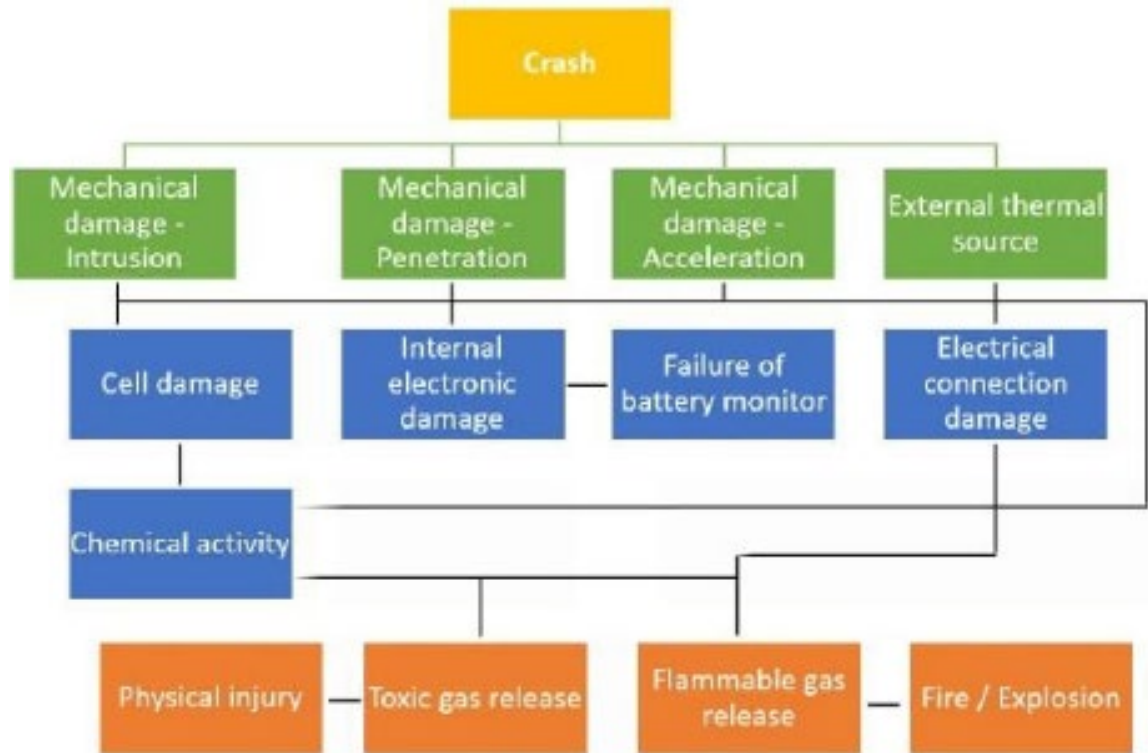
HYBRID  
GAS &  
ELECTRIC  
VEHICLE

ICE  
INTERNAL  
COMBUSTION  
ENGINE (GAS)



<b>Electric Vehicle/Car (EV), Electrically Chargeable Vehicle/Car</b>	Generic terms for a vehicle powered, in part or in full, by a battery that can be plugged into the mains
<b>Pure-EV, Pure-Electric Car, Vehicle, All Electric, Battery Electric Vehicle (BEV), Fully Electric</b>	A vehicle powered only by a battery charged from mains electricity. Currently, typical pure-electric cars have a range of 100-200 miles
<b>Plug-In Hybrid Electric Vehicle (PHEV), Plug-In Hybrid Vehicle (PHV)</b>	A vehicle with a plug-in battery and an internal combustion engine (ICE). Typical PHEVs will have a pure-electric range of 10 to 30 miles. After the pure-electric range is used up, the vehicle reverts to the benefits of full hybrid capability
<b>Extended-Range Electric Vehicle (E-REV), Range Extended Electric Vehicle (RE-EV)</b>	A vehicle powered by a battery with an ICE powered generator on board. E-REVs are like pure-EVs, but range is extended by an on-board generator. With an E-REV the vehicle is still always electrically driven and is known as a series hybrid
<b>Hybrid Electric Vehicles (HEV), Full/Normal/Parallel/Standard hybrid</b>	A hybrid vehicle is powered by a battery and/or an ICE. The power source is selected automatically by the vehicle, depending on speed, engine load and battery charge. This battery cannot be plugged in, so charge is maintained by regenerative braking supplemented by ICE generated power
<b>Mild Hybrid</b>	A mild hybrid vehicle cannot be plugged in or driven solely on battery power. However, it does harvest power during regenerative braking and uses this during acceleration. Some mild hybrids now use 48V technology
<b>Micro Hybrid</b>	A micro hybrid normally employs a stop-start system and regenerative braking which charges the 12V battery
<b>Stop-start Hybrid</b>	A stop-start system shuts off the engine when the vehicle is stationary. An enhanced starter motor is used to support the increased number of engine starts
<b>Alternatively, Fueled Vehicle (AFV)</b>	Any vehicle which is not solely powered by traditional fuels (i.e., petrol/gasoline or diesel) is referred to as alternative fuel
<b>Internal Combustion Engine (ICE)</b>	Petrol/gasoline or diesel engine, as well as those adapted to operate on alternative fuels





## Risks/Dangers

- Electric Shock
- Physical weight of the battery
- Electrolyte/damaged batteries
- Health issues such as pacemakers/electrical devices





# PPE and Tools

# Recovery and transportation

Recovery and transportation are key parts of an auto recycler's work. Many ICE vehicles require special handling in this respect, but there are even more issues to consider when EVs are involved. For example, the speed at which they may, or may not be towed, and electrical safety after a serious collision.

Initial assessment auto recyclers should carry out an initial visual risk assessment. PPE should be always worn. Steps should then be taken to secure the safety of themselves and others upon arrival at the auto recycler's facility involving EVs.



# Dismantling/Processing

Battery removal/storage

Electric motors, inverters and component removal

Depollution process

The Professional Automotive Recycler will need to evaluate all EV's for:

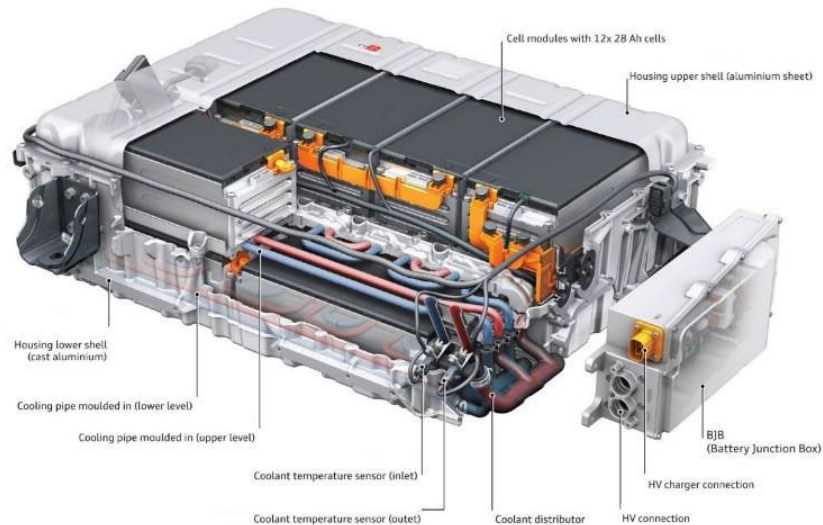
- Cracks in upper part of battery housing or battery tray
- Deformation of upper part of battery housing or battery tray
- Color changes due to temperature and tarnishing of housing
- Escaping electrolyte
- Damage to high-voltage contacts
- Fitted and legible information stickers
- Fitted potential equalization line

Auto recyclers will need access to information on all emerging technologies in order to compete and protect their employees



# Safety First

- BMP's for initial intake are developed and adhered to for all personnel
- Assure employee safety (pacemakers/insulin pumps)
- Obtain OEM instructions for handling and storing



Clearly before any form of dismantling or salvage work takes place an EV should be made safe. This is the same procedure as for normal service and repair. You must also remember that even after de-energization, the HV battery is still live. It should be the first component to be removed from the vehicle and it should be disconnected in the recommended sequence.

# **Auto Recycling will Continue to Evolve as Needed**

- ❑ Auto recycling has been around, as long as, the automobile itself and just like the automobile we have evolved and changed to adapt to the needs of our customers and our communities.
- ❑ Internal combustion engines (ICE) and transmissions whether automatic or standard are our industry's top two profit sources
- ❑ There will be a huge shift into a new market for auto recyclers with the advanced technology of electric and self-driving vehicles



# Big Gaps in Information and Resources

ARA is highly engaged and has made it one of our highest priorities to address any gaps in information resources and training for our members and the auto recycling industry. We know that training and resource materials will need to be dynamic to address the rapid pace of change in the EV marketplace.

Auto recyclers will continue to play a strategic role in the end-of-life vehicle processing and hope that we be considered a strategic partner to assure electric vehicles like their predecessors the internal combustion engine powered vehicles continue to be processed at end of road life by those most qualified to do so - the professional automotive recycling industry.





# Adoption of electric drivetrains accelerates

The surge of electric car sales is undeniable, but the noise generated by politicians and environmentalists cheering on the battery revolution hides a compelling fact; far from its imminent demise, internal combustion engines (ICE) are going to be around for a long time yet

We have seen figures that by 2050 between 60 and 80% of global new car sales will be electric (this comprises battery, plug-in hybrid and fuel cells), but ICE-based cars will still account for 1.9 billion vehicles on the road because of their longevity.

# Lithium-Ion Battery Recycling

**Do you currently purchase (electric vehicles=EV; Hybrid) with Lithium-Ion batteries (EVB)**

Auto Recyclers responded - 67.74% Yes  
32.26% No

Those responding handled anywhere from 1 to 50 vehicles in the last 6 months

**If you knew in advance that an EV battery had no resale value, would you likely reject the vehicle or assess a fee to receive/process?**

30% said they would reject  
66.67% said they would assess a fee to process  
6.67 answered other



## Train Smarter Not Harder

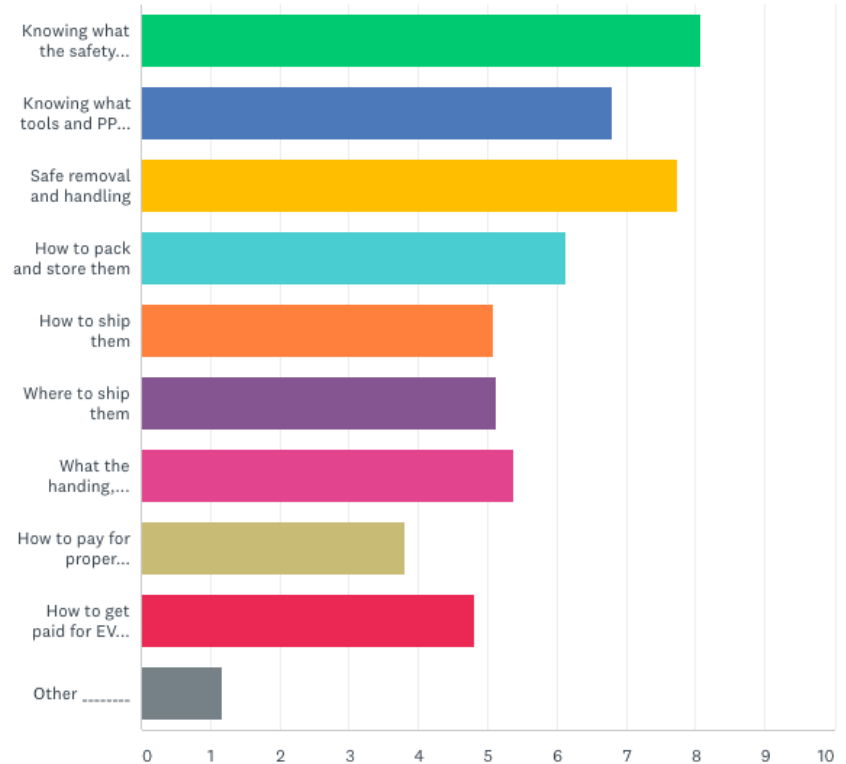
The automotive recycling industry has become more complex as vehicles become more advanced. As a result, the demand for training that increases safety, efficiency, and profitability has become a vital need.

ARAU meets this demand with online training and certification programs developed & taught by top industry professionals to meet the needs of today's professional automotive recyclers

# NAATBatt AUTO RECYCLER SURVEY (ARA MEMBERS)

## IN ORDER OF PRIORITY, WHAT INFORMATION ABOUT AN EV BATTERY DO YOU NEED FOR YOUR OPERATIONS?

1. Knowing what the safety issues are
2. Safe removal and handling
3. Knowing what tools and PPE will be required
4. How to pack and store them
5. What the handling, storage, environmental and transport regulations are
6. Where to ship them
7. How to ship them
8. How to get paid for EV batteries suitable for reuse
9. How to pay for proper recycling



# Thank You



# Questions