

IS ZERO EMISSIONS EVEN POSSIBLE?

How the historic transition to 50% EVs by 2030 and zero emissions by 2050 will impact auto recyclers.

By Stacey Phillips



With U.S. government mandates in place requiring 50 percent of all new vehicle sales be electric by 2030 and the goal of net-zero emissions by 2050, experts are weighing in on the historic transition to EVs and how it will impact all industry segments, including auto recyclers.

“Whether you doubt the existence of climate change, grid capacity, or have range anxiety, EVs are going to be manufactured and sold in great numbers and eventually end up becoming an end-of-life (EOL) vehicle that will be introduced into our business models in the future,” said Scott Robertson, Jr., president of Robertson’s Auto Salvage. Robertson co-owns the family business in Wareham, MA, with his brother, David.

As a past president and current ARA board member, as well as a board member for the Automotive Recycling Training Institute (ARTI), Robertson foresees the EV government mandates moving ahead as projected.

“There are always going to be naysayers,” he said. “The 100% electric vehicle is not for everybody, but it suits the needs of a large percentage of the population.”

When people hear the word “EV,” Robertson said they tend to think about 100% electric vehicles. However, plug-in hybrids and alternative fuel cell transportation like hydrogen are also future options.

“We’re commending the government on their aggressive approach and goal to reduce the greenhouse gas emissions from motor vehicles,” said Emil Nusbaum, ARA’s Vice President of Strategy and Government and Regulatory Affairs, who received his Doctor of Law degree from the University of Maryland and is a Certified Information Privacy Professional in the U.S. (CIPP/US). “It’s good to see that the government is pushing for this shift to electrification and for vehicles to have a lower carbon footprint.”

He said ARA is encouraged by the heavy government investment in battery technology throughout a vehicle’s lifecycle – ranging from mining to the reuse and recycling of EOL batteries. Investments are also being mirrored by the private sector.

“That is what ultimately is going to be necessary if we’re going to come close to meeting those mandates and aggressive goals by 2030,” he noted.

Although he said ARA commends the support of government and the private sector, “on the flip side, we want to make sure that this transition is conducted effectively.”

Sandy Blalock, executive director of ARA, said the issues concerning emissions have been around for a long time and need to be resolved.

“However, mandating that the fleet be 50% EV by 2030 might be a stretch,” she said. “There is a lot in play to get to zero emissions because just over 60% of utility-scale electricity today is still generated by fossil fuels so the infrastructure is a huge part of assuring that number can be obtained and sustainable.”

Marty Hollingshead, president and owner of Northlake Auto Recyclers and immediate past president of ARA, said he is taking a pragmatic approach to the government mandates.

“It’s probably not going to happen unless there is some change in technology,” predicted Hollingshead, who operates a late-model automotive recycling facility in Hammond, IN.

The challenge, according to Hollingshead, is energy capacity.

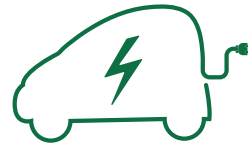
“We’re at capacity as far as our ability to generate electricity for our current demand,” he said. “Unless this country wants to re-adopt nuclear power, there’s no way we’re going to be able to generate enough electricity to supply the demand needed.”

Hollingshead foresees EVs being utilized in metropolitan areas where pollution is a concern, and range as well as driving distance isn’t an issue.

Additional barriers involve the availability of raw materials.

“Projections show that massive penetration of EVs will strain material supplies, both in the U.S. and globally,” said Dr. Linda Gaines, an environmental scientist and systems analyst at Argonne National Laboratory in Lemont, IL. “The current path is probably unrealistic and I’m not alone in thinking that. There needs to be something different that happens along the way.”

Founded in 1946, Argonne National Laboratory is a federally funded research and development center owned by the United States Department of Energy (DOE) and administered by the University of Chicago. An essential part of the lab’s work includes researching battery production and the manufacturing cycle. For example, scientists pioneered the technology contained in the Chevrolet Volt’s battery.



“Any vehicle that has a high-voltage battery has to be handled in a different manner than an ICE car and employees need to be trained.”

Gaines joined the lab in 1976 and currently examines energy use and the flow and processing of materials in the transportation sector as part of the Energy Systems and Infrastructure Analysis division. Recently, Gaines’ research has focused on analyzing process options for recycling lithium-ion batteries.

“It became fairly clear that these materials were going to be in tremendous demand, so I’ve been looking at technologies for recycling,” she said.

In 2019, she helped found ReCell, a lithium-ion battery recycling research and development center launched by the DOE. ReCell is a collaboration of four national labs, the private sector and universities to develop advanced technologies that safely and cost-effectively recycle lithium-ion batteries. Her work now includes analyzing the raw materials needed for EVs and their impacts.

“The quantity of material that’s going to be needed for 50% of the market to be electric by 2030 is going to be really difficult to supply unless we go with alternative materials and smaller batteries such as those in plug-in hybrids,” she said.

The primary materials in demand include cobalt, nickel, and lithium. While the United States has some lithium reserves, many raw materials are imported and recycled outside of the country.

“Often, the recovered material is sent back to the Far East to get processed so we end up importing it in the first

place and then importing it again,” she explained, adding that this isn’t ideal for national security, energy use or environmental impacts.

Although she said recycling will be important, Gaines noted that only a small percentage of raw materials could possibly come from recycling until the demand flattens out.

“[However,] I don’t think we should be giving up on the goal of electrification,” she said. “I think that it’s important for climate change.”

Argonne is researching transportation technologies that will help with climate change, such as biofuels, including a sustainable aviation fuel.



The Future Role of Auto Recyclers

As the country transitions to EVs, Robertson believes recyclers will be a critical part of the battery industry.

“We have the facilities to dismantle and harvest EOL vehicles and, most importantly, the license to do it,” he said.

With the average EV battery lasting up to 10 to 15 years, Robertson said they can be broken down and repurposed in many configurations; most commonly, they are utilized within energy storage systems for an additional 10 years.

Robertson believes EOL batteries will likely be sold for reuse when possible and auto recyclers will get involved in what is referred to as “cracking” the batteries. “We’re going to open the battery pack and determine which modules are reusable to be sold,” he explained.

About half of the estimated 20,000 entities currently handling EOL vehicles are unlicensed. As a result, many propose certifying auto recyclers to ensure they are properly trained.

“Any vehicle that has a high-voltage battery has to be handled in a different manner than an ICE car and employees need to be trained,” said Robertson.

There are also proponents of government regulation focused on who will be able to purchase EOL EVs and mandates around “leakage” where batteries leave the country.

“Once they leave the country, they never come back,” he said. “The first thing we need to do is stop the leakage and keep these cars within the United States.”

Robertson said auto recyclers will likely have three options. The first is to stay the course and conduct business as usual. “Most in our industry will take this approach,” he predicted.

The second choice, which he said most recyclers will opt for, is to adapt when needed. “This is the safest course to take when encountering the impending EV wave,” he said. “Our facilities and business models run really well on the product we presently dismantle.”

Robertson said that early adapters will likely reap profits, while others might resist until the very end, leaving opportunities available.

The third business model, according to Robertson, is to ride the EV wave. “This is by far the riskiest path to take and I urge you to have all your bases covered before jumping in,” Robertson warned. “Implementing a slight change to your business model is hard with employee and customer resistance.”

Although he said this is most difficult choice, it could be the most profitable.

“There’s so much money being thrown at people from the U.S. government either in the way of loans or grants,” he said.

Within the Inflation Reduction Act, Robertson said there are billions of dollars allocated to sustainable “clean” energy industries. “The high-voltage battery industry is getting a great majority of it,” he noted.

In August, the DOE announced a \$15.5 billion package of funding and loans primarily focused on transitioning to EVs, retooling existing plants and rehiring existing workers.

Earlier this year, Nusbaum was invited by NAATBatt International to give a presentation during their sixth annual battery recycling workshop about the transition to electrification.

“What we need to do is replicate the successes of the existing automotive industry as we transition to EVs,” said Nusbaum.

He said the key is to reliably assess the condition of a battery pack throughout its lifecycle. “It requires users throughout the vehicle value chain to have a clear understanding of the quality, performance, and remaining service life of an EV.”

This involves having a successful new car sales market, a used car sales market that allows vehicles to be financed, insured and repaired, and also a product that can be reused, repurposed and recycled at EOL.

Nusbaum said this will be necessary to reduce costs and allow for further adoption of these vehicles.

Some of the challenges to EV adoption he shared include reuse and repurposing, the race for critical minerals, diverse battery chemistries and compositions, strengthening domestic manufacturing and materials sourcing, and maximizing resources most cost-effectively to reduce carbon outputs. Other issues are battery service length and the valuation of EVs.

Nusbaum said that batteries, which are the majority of an EV's value, need to be put to their highest and best use at their end-of-first-life, whether that's a reuse application going into an energy storage system as repurposing or being recycled for raw materials.

"We need to be able to assess their condition so they can be filtered through the free market," explained Nusbaum. "This helps bring down costs to vehicle owners, maximizes the energy output in the original manufacturing of that part, and reduces the carbon footprint of the specific component throughout its life cycle."

Based on his research, Nusbaum said that motor vehicles are one of the most recycled consumer goods and automotive recycling is one of the few carbon-negative industries in the automotive sector. Approximately 12

million vehicles are recycled annually, and 86% of a vehicle is reused and recycled by weight.

Nusbaum said the premise of the automotive recycling business model is about reusing and maximizing existing resources with the added benefit of being environmentally sound.

In March, ARA announced its partnership with Worcester Polytechnic Institute (WPI), located in Worcester, Massachusetts, to undertake a nationwide study to illustrate the industry's environmental benefits and quantify the carbon footprint reduction that utilization of Recycled Original Equipment® (ROE) parts has in comparison to new automotive parts. The study, expected to conclude by year-end, builds upon the findings of research conducted in 2017 by WPI of professional automotive recyclers in Massachusetts.

"That study found that by reclaiming auto parts for re-use, then recycling the steel and aluminum left in vehicles at the end of their usable life, members of the Automotive Recyclers of Massachusetts (ARM) reduce the state's carbon footprint by at least 2.2 million tons of carbon dioxide annually," according to an ARA press release.

As EVs increase in scale over the next five to seven years, Hollingshead recommends auto recyclers pay close


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attention to three primary areas regarding EV batteries, namely same use, second life and recycling.

“Same use will have the greatest value to auto recyclers from a revenue standpoint provided we can certify the state of health and state of charge,” he explained. “Simply put, this means how much life is left in the battery.”

Hollingshead foresees the biggest usage for second life will be for energy storage and the largest use will be for grid stabilization.

“This will act as a reservoir to hold excess energy generated, and make it available for ‘peak demand times,’” he said.

In terms of recycling, he said batteries will be shredded for the recovery of scarce materials used to make new batteries. “This will have the least value to auto recyclers, and we may very well have to pay for it,” he said.

With this new technology, Hollingshead said vehicles will be “connected” and battery data will be monitored and recorded. “While this information will be huge for us to have and be able to access, we won’t be able to take it at face value,” he noted. “While it can be a guide, we will still need to triage and assess the battery to certify it.”

As part of Gaines’ research, she examines the recycling stage in the lifecycle process to determine environmental impacts and costs.

Although there are some smaller “mom-and-pop” recyclers, Gaines described automotive recyclers as a sophisticated industry. “They’re not junkyards,” she said. “They know what’s going on with the cars and keep very careful track of all the usable, reusable parts from an EOL vehicle.”



An emerging segment of the industry focuses on assembling used batteries and re-selling them.

This includes the opportunity to reuse batteries when vehicles are taken out of service.

“Even though the car crashed, the battery may still be perfectly good and usable,” she explained.

One issue recyclers will likely contend with are vehicles that are operable but only support so many miles a day due to battery range. “We’ll have to address whether or not we want to allow vehicles to be sold overseas or recycled in the U.S.,” she noted.

An emerging segment of the industry focuses on assembling used batteries and re-selling them.

“That obviously has to be done responsibly,” said Gaines. “If you want to reuse a battery from an EV in the U.S. and sell it legally, it has to be lab certified.”

Although many say that’s a positive development in the U.S., Gaines cautioned that it’s promoting an overseas market for the battery recycling industry.

Gaines is part of NAATBatt’s Second Life Use Committee, which examines the technical, economic, regulatory and legal challenges involved in repurposing high-capacity advanced batteries for second-life use. The committee also studies regulatory requirements applicable to those second-life applications. NAATBatt International promotes the development and commercialization of electrochemical energy storage technology and the revitalization of advanced battery manufacturing in North America.

How Auto Recyclers Can Best Prepare

Gaines stressed the importance of EVs being handled by responsible recyclers who have trained mechanics to remove the batteries, test them and ensure they are handled and stored safely. This includes new and second-life batteries.

“There is the potential for both electrocution and fires with new and used EV batteries, so this is something that they need to take care of very carefully,” she said. “Battery fires are no joke.”

She said used batteries are a valuable resource so they will likely be one of the aftermarket products that automotive recyclers end up dealing with – with the caveat that recyclers are certified and know how to handle them.

Most agree that safety is paramount.

The most important priority right now for recyclers, according to Nusbaum, is to learn about high-voltage vehicles.

“They need to be handled with extreme caution,” he said. “We don’t want to have an environment where automotive recycling employees, as well as anyone dealing with the vehicle, is going to put their lives at risk.”

Nusbaum said this is a priority issue for ARA members who are starting to see more vehicles that have high-voltage batteries.

“They need to be treated appropriately, responsibly and safely,” he said.

Hollingshead agrees.

Through his research, he said that one of the challenges with EVs is the potential of the lithium-ion batteries having what is known as a thermal event or thermal runaway. According to the Electrochemical Safety Research Institute, this is when they are in an uncontrollable, self-heating state and can result in the ejection of gas, shrapnel and/or particulates, extremely high temperatures, smoke and fire.

Once the battery goes into a thermal event, there is a chemical reaction, Hollingshead explained, because anything that stores energy is always going to be inherently unstable.

“Our role as auto recyclers is going to be how to responsibly handle these vehicles at end the life,” he said. “We have an obligation to keep people safe and do the right thing.”

As the industry changes, Hollingshead encourages recyclers to be open to change.

“The thing about auto recyclers is that we’ve always been innovators,” said Hollingshead. “We have to figure out ways to handle these vehicles and dismantle them in a safe, efficient and environmentally compliant manner, and how to make money off them.”

What the market will be for EVs remains to be seen; however, Hollingshead predicts there will be markets for parts on these vehicles that people haven’t thought of yet.

Comparing battery powered hand tools on the market today versus five years ago, Hollingshead said the batteries and the motors are much more efficient, powerful and durable.

He forecasts there will be demand for electric drive motors for their second-life use and industrial applications for conveyors, lifting equipment, compressors and pumps. “These motors are extremely efficient and more powerful than ones made just five years ago,” he said.

Blalock said the professional automotive recycling industry is filled with innovative and intelligent people. “Just like we have for over 100 years, we will continue to adapt to the changing designs in vehicles and be ready to handle EVs as they become more prevalent,” she said.

“This will require a higher-level educated and well-trained workforce, and ARA has been engaged to ensure that the necessary training and resources are available to assist our industry members.”

She said auto recyclers will also have to make infrastructure and process changes within their facilities to accommodate and safely process EVs and the storage of their components, including high-voltage batteries.

ARA does not recommend storing batteries in a business’s main building but as far away as possible in case of a thermal event. Many recyclers have been utilizing Conex (Container Express) storage boxes, but Blalock said they must be equipped to prevent overheating, be able to handle colder temperatures and protect the batteries.

“Make sure to do your research on the necessary safety tools and personal protective equipment (PPE) that you will need on hand to protect your employees,” Blalock recommends. “Also, ensure everyone in your facility has some training so they fully understand the potential hazards affiliated with high-voltage vehicles.”

To stay up to date with industry issues, Blalock recommends attending state trade shows, as well as ARA’s Annual Convention and Expo.

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To best prepare for the anticipated changes, Blalock advises automotive recyclers to start now. “Do not wait!” she said. “ARA University has the training and resources available to assure you understand how to safely process high-voltage vehicles, including the handling and shipping of the batteries.”

Ultimately, Robertson said that auto recyclers will be faced with a choice. “You can stay in business for another 40 years dismantling internal combustion engine (ICE) vehicles that will still be on the road or embrace EVs,” he said.

For auto recyclers who choose to continue focusing on dismantling internal combustion engines, he predicts there will be opportunities for success.

He also forecasted that it will be profitable dismantling ICE vehicles because people are going to move away from manufacturing replacement parts for those cars and move towards building replacement parts for EVs.

“You need to choose that path that is best for yourself, your family, your employees and your facility,” he said. “No matter how you ride the wave, the future of our industry is bright.”

Training to Get Ahead

A critical component of preparing for the future, according to Hollingshead, is learning about EVs and their batteries.

“I cannot overstress the importance of the training and certification,” he said. “When I was 17 years old, a wise guy told me, ‘You either get educated or you get left behind.’”

Looking ahead, Hollingshead said the days are numbered for what he referred to as “caveman operations.”

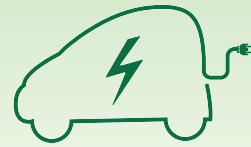
“They are not going to be able to compete,” said Hollingshead. “However, there will be opportunities for those who have invested the time, work and money into their businesses and their people and processes to do things properly.”

He said the automotive industry can be as primitive or sophisticated as an owner wants to make it but opportunities are available to evolve.

As part of ARA University, education is available to all members on how to safely handle EVs, assess their health, store the batteries and ensure vehicles are safe. This includes training guides, an EV readiness checklist and database, and a certification program recognized by multiple government agencies.

“The staff at ARA have done a great job as far as developing the training and curriculum that we need for EVs,” said Hollingshead, who is the immediate past president of ARA and has been involved with the organization since 2016.

Nusbaum encourages ARA members to capitalize on the available training. “ARA has a myriad of resources



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that we’ve been working on for the last decade to prepare for this reality,” he shared.

In addition to ARA training, the Inter-Industry Conference on Auto Collision Repair (I-CAR) is educating the collision industry about the safety protocols, processes, vehicle assessments and handling of EVs through educational programming. This includes both online and hands-on training specific to EVs. Resources are also available to help identify how to safely interact with an EV through Best Practices documents, Repairers Realm live web series, Just in Time videos, and the I-CAR Repairability Technical Support (RTS) portal.

“Our objective as a neutral, not-for-profit founded by the collision industry is to prepare technicians and shop owners for what will impact them, whether it’s government mandates, like zero-emissions standards, OEM adoption of vehicle makes and models to meet the needs of their consumers, and/or emerging technologies,” said Jeff Poole, lead subject matter expert at I-CAR.

For any industry interacting with these vehicles, Poole said that it’s critical to fully understand and continue to be at the forefront with training that guides professionals on how to repair or process electric vehicles safely. Poole advises recyclers to continue learning as often and as much as possible to ensure everyone is kept safe.

“With a culture of learning as your foundation, share your experiences and knowledge with others in the industry to maximize the state of readiness in accordance with OEM repair procedures so we’re able to adapt to the evolution of the electric vehicle technology collectively and safely,” Poole added.

More details about how the industry can prepare for EVs can be found at [I-CAR.com/ev](https://www.i-car.com/ev).

For ARA news, resources and educational materials, visit <https://arauniversity.org/>. 📧



Stacey Phillips is a freelance writer and owner of Radiant Writing & Communications, where she specializes in providing content and digital marketing for the collision repair industry. She also serves as the marketing director for CIECA since 2017.