

The positives and negatives of EV batteries

By Brian Zeidner

Director of Member Services

BATTERIES are a crucial component of an electric vehicle (EV), so I want to try to address some of the questions we frequently hear concerning the batteries that power an EV.

Most EVs utilize lithium-ion batteries, the same type of batteries used to run most modern cordless tools. These differ from the lead-acid battery used to start the engine of your gas-powered vehicle and the dry cell batteries used in flashlights, which commonly come in sizes from AAA to D.

A couple of years ago, I had the opportunity to tour the Tesla Gigafactory in Sparks, Nevada. I belong to an advisory group for energy resources that arranged the learning opportunity. The technology and robotics in the plant were impressive, but the battery construction was especially fascinating.

Individually, the Tesla-manufactured lithium-ion batteries are about the size of a C dry cell battery. The batteries are connected in a manner that reminded

me of a machine-gun belt of ammunition. These bandoliers of batteries are then installed into a metal box that looked like a large ammunition can.

Several of these boxes are then assembled into the bottom of the EV during manufacturing. The batteries are configured to provide 48 volts for the operation of the electric drive motors and for the vehicle's electronic components.

Many members have asked me how far an EV will go before the batteries need to be replaced. As explained at the Tesla facility, the battery system is designed so that an individual battery can fail without impacting the entire battery pack. Tesla claims its battery packs are designed to last more than 300,000 miles. The expectation is the batteries will last 10 to 15 years.

Based on some internet research, I found several EV owners claiming to have driven hundreds of thousands of miles on their original batteries. Further research indicates that replacing an EV's battery would cost thousands of dollars, with some predictions

as high as \$20,000.

Many experts concur that battery longevity depends on how the vehicle is used, including driving habits, weather, battery depletion levels and charging practices.

Members have also questioned the use of rare earth metals, such as cobalt and lithium, which are often used in manufacturing certain types of batteries. Some manufacturers have transitioned to limited or no use of these types of metals in their products.

Additionally, members have asked what happens to dead batteries after they are replaced? There is currently a disposal issue with EV batteries, but it's exciting to note that the Argonne National Lab is doing great work regarding the recycling of these batteries.

Given the advancements in electric vehicle technology in the past five years, I believe battery longevity and recycling issues are likely to be solved soon. I also think range will increase for many models, and an extensive national network of chargers will continue to be deployed. 🌱