

SOLUTIONS      Huck Fairman

## THE LATEST ON EVs

As our planet warms and we experience extreme weather of all varieties, people, governments, and manufacturers are seeking ways to reduce emissions. Because vehicles are a major source of those emissions, many in the same groups are turning to and encouraging the manufacture, usage, and improvement of electric vehicles.

While scientists and engineers agree that generally electric (plug-in) vehicles (EVs) are more climate-friendly, they still are not without their climate and health impacts, depending where they get their electricity and their raw materials from, and what happens to their batteries following their automobile lives.

As New Jersey has one of the cleaner mixes of electric power production, with natural gas, solar, a wind farm coming, nuclear, and maybe one last coal power plant all contributing, driving an electric vehicle provides real benefits, i.e. fewer emissions. But across the nation, electric grids need to become cleaner if we are to reach the zero-emissions goals many advocate.

Researchers at M.I.T., using the online tool, [carboncounter.com](http://carboncounter.com), have found that a Chevy Bolt electric car produces 189 grams of CO<sub>2</sub> for every mile driven, a Toyota Camry produces 385 grams of CO<sub>2</sub> per mile, while a new Ford F-150 pickup produces 636 grams of CO<sub>2</sub> per mile driven. But all of this depends on how electricity is produced, and we must acknowledge that coal powered grids increase emissions even for the levels calculated for EVs.

Fortunately now, states and nations are working to replace existing grids with cleaner ones, and auto manufacturers are producing cleaner vehicles – all with the goal of reaching zero emissions.

But the batteries for EVs come with several undesirable impacts. The lithium-ion batteries that power most EVs rely on raw materials like cobalt, lithium, and rare earth elements. These have been found to pose environmental and health hazards from their mining, smelting, and considerable water usage. Manufacturers need to work with mining concerns in order to reduce, or eliminate the use of cobalt, while mining companies need to reduce their water usage. Many of the companies and miners are aware of these problems but have not yet found, or adopted, solutions.

Another challenge facing lithium-ion batteries is that currently their recycling rate is only 5 percent, whereas 99 percent of the more commonly used lead-acid batteries are recycled. But two benefits, if widely adopted, could change the situation.

Recycled batteries contain metals and other materials that can be recovered and reused. But here again, the recycling method can require large volumes of water and produce pollution itself. Further development, therefore, is needed. But at the same time, researchers and manufacturers are finding a grid storage potential for old batteries. Those used, but still with remaining storage capacity, could be adapted to store solar and wind generated power for periods when there is no sun or wind.

These developments are not yet fully refined, but there are encouraging research reports. What is absolutely certain, however, is that civilization needs to move away from producing fossil fuel emissions, even if current alternatives are not perfect. Bill Gates, among others, warns that climate change is the greatest challenge to our very existence that we have ever faced. We are all facing it, and all need to contribute and participate.

