TO EV OR NOT TO EV

ARE WE READY?



BY SUSAN THWING

As more and more Americans make the choice to own an electric vehicle (EV)—there are an estimated 1.5 million EVs on the road right now—it may be time to ask the question: *are we ready?*

When President Joe Biden was elected in 2020, nearly 3 percent of US automotive sales were electric vehicles. Campaigning on a goal to have nearly half of the new cars sold by 2030 be EV, Biden also earmarked money in his initial infrastructure plan and is currently working toward that plan.

There are several advantages to owning an EV. For example, no fossil fuel is required for propulsion so owners can save money on gas. Estimates state that paying $0.10 per kW is the equivalent of driving on gasoline that costs less than $1 per gallon.

EVs are also considered environmentally friendly and have lower maintenance and, some say, a better performance. But there are also downsides to electric cars, such as their batteries require rare metals to make and the actual manufacturing of electric cars causes more emissions than gas powered vehicles. In addition, EVs can be expensive to buy.

Still, EV manufacturing and ownership is a driving force in the automobile industry—and governmental programs—today. Many incentive plans are in place to encourage more EV drivers. In Michigan, the Consumers Energy PowerMIDrive program offers rebates to residential customers who install Level 2 or direct current fast charging (DCFC) stations. Residential customers are eligible for a $500 rebate to install a qualified Level 2 EV charging station. In addition an Electric Vehicle (EV) Charging Station Rebate, among other programs, is offered via DTE Energy.

Consumers can also file for federal or state tax credits. The credit of up to $7,500 will be offered to people who buy certain new electric vehicles as well as some plug-in gas-electric hybrids and hydrogen fuel cell vehicles. For people who buy a used vehicle that runs on battery power, a $4,000 credit will be available. (Note: More information on other Michigan incentives can be found at https://afdc.energy.gov/laws/all?state=MI,)

Gov. Gretchen Whitmer announced plans in September at the Detroit Regional Chambers Economic Policy Conference to "bolster Michigan's electric vehicle charging infrastructure and train more workers for jobs in the industry," according to a *Bridge* magazine article. MichAuto, an initiative of the Detroit Regional Chamber, predicts that switching to autonomous vehicles would lose the state nearly 2.6 million lost jobs by 2051. With Whitmer's plan, she hopes to "benefit from the shift to electric vehicles to save jobs that otherwise would be threatened by the demise of the internal combustion engine."

To encourage that happening, the *Bridge* article indicates that "State leaders are working with an initial $1.25 million to provide grants to install publicly-accessible charging stations along the state's Lake Michigan shoreline. Michigan also plans to spend up to $5 million to start an employer-led training program to build a workforce capable of filling jobs in the globally competitive vehicle electrification industry."

But while the demand for electric vehicles climbs, some states do not yet have the appropriate infrastructure to make owning an electric vehicle viable. Staff at The Fabricator—an online digital media publication in the metal manufacturing marketplace—recently took a look at which states were best equipped. The organization looked at the number of registered electric cars per capita, the availability of public chargers, state tax incentives for personal electric vehicle owners, gas prices, and electricity prices to determine which states are the best (and worst) to own an electric vehicle.

Michigan was 24th on the list with 17,460 vehicle registrations; 1,037 charging stations and 4664 public chargers. Expense wise, gasoline costs $3.96 per gallon while the average electricity price is 12.21 (cents/kwh).

South Carolina-based Sitarian Corporation's EV Exchange also conducted an extensive online survey to determine a baseline for the level of preparation status of the country for an EV onslaught. The EV Exchange was created to provide a strategic, business-to-business

program and platform allowing the three key stakeholder communities—EV manufacturers and its ecosystem players, private sector energy and utility infrastructure organizations and their suppliers, and Federal, State & Local Energy & Utility Departments, Agencies, Regulators—to work in partnership to plan, execute and achieve EV goals and critical positive climate change impact initiatives. The program "offers the stakeholder communities the forum to meet and educate each other about the operations, infrastructure, investment, cost recovery, regulatory and policy issues with the expanding deployment of EVs and EV infrastructure to execute and achieve goals for effective EV deployment and to meet climate change goals and balance policy issues around ESG."

Respondents to the 2022 survey included EV industry players such as manufacturers; federal, state and local government representatives; utilities and agencies; as well as private sector energy and utilities. Among the areas looked at included charging infrastructure, key technologies, cost and total cost of ownership, human resources, cyber security and the supply chain.

The results of the initial survey indicated: "Across all EVX core research areas, the EVX Cross Intelligence Survey™ data indicates that the three communities believe that currently we are not ready for adequate EV adoption and deployment."



Paul Sitar

The EV Exchange will continue to follow up with additional Think Tank surveys, but initially, Paul Sitar, CEO, Head of Business Creation & Development at Sitarian and Creator and Director of the EV Exchange, said "To go from a petroleum-based society and economy to an electrified one is not a small task.... It was profound to see the results of our survey. Clearly moving to EV is a great initiative, and we understand its importance, but we are not ready to go for 100 percent electrification... Even if we wanted to give EVs to everyone, do we have the infrastructure to handle it? The answer is no."

Sitar identified the main issues are: lack of infrastructure; supply chain; raw materials; and human resources. There's also the question of security, especially during power outages, such as the Eastern Seaboard Blackout of 2003.

"It is a point of national security. We know that the energy infrastructure is always being probed, even right now. It is one of our vulnerabilities. You have to look at what's going on in Ukraine right now. Attacking the electrical grid kills many birds with one stone. Besides knocking out power, you're knocking out electricity for water purification, etc.," he said, stating that to be completely ready, a disaster plan for data recovery must be heightened.

"Security is a very important aspect—we must look at resiliency, disruption, and what backups are in place. The government and private sector are anticipating these things. Whether it's bilateral and bidirectional charging, having a generator for X amount of miles—which is better than storing kerosine or gasoline in your garage—disaster planning will be paramount," he explained.

Human resources—having the trained staff and expertise available to produce and repair the EVs—is also crucial. Right now, as one respondent to the survey said: "We have the bare bones. We need training for service techs and electricians installing charging equipment, incentives for existing licensed repair facilities to send people for training and procure new equipment for servicing EVs. A professional ASE certification exists for technicians. The existing state equipment is in a serious state of disrepair and no one seems to want to be responsible for maintaining the existing network."

Sitar explains that a new focus is needed in training. "As a mechanic, the internal combustion engine has its own knowledge base. It's going be a different knowledge base for EVs—hardware and computer software will be paramount in running these vehicles. That's just off a battery electric vehicle. Then think about autonomous—it's going to be like a supercomputer. It will need a new sophistication of computer understanding. It will parallel what a mechanic now does but it will be a different language," he said.

"There is a gap right now, a definite inadequacy both in high school education and even higher ed— there is a knowledge gap that we need to look at," he said.

Material engineering is going to return full force. "Materials are going to be so important right now for these vehicles. Materials will have to be lightweight; the enemy of a battery is weight. The heavier a vehicle, the more drain on the battery. Plus we need to look at the amount of petroleum it takes to run our grids, and to manufacture our vehicles," he said. "There is a lot of plastic in EVs, aluminum instead of steel, so you're looking at composites, thermoplastics, new materials, instead of steel and that still takes a lot of petroleum."

"Many higher education engineering curriculums throughout the US have done away with material engineering for other focuses. Now it will need to become a core competency again," Sitar explained.

This new education will not be a one time thing, he added. "Because vehicles are becoming so hardware and software intensive, training will be ongoing. Even your laptop software and technology is always changing. It is going to challenge the constant evolution of learning to support electrical on a large scale.... It will be a constant learning process."

Despite the challenges, Sitar said moving to EVs is possible and potentially positive. "We have to look at TCO—total cost of ownership—and everyone's grappling with that question. Everyone is hoping electrification will have a major benefit to the environment and planet. But there must be a smart, strategic, thoughtful review, to make it happen."