

2022 – Positively an Electric Year

By Martin Flusberg

I have been driving electric cars since 2012 and am on my 3rd EV. The first was a prototype that BMW built called the Active E; I literally received the last of the 700 cars they made available in the US for a 2-year only lease. Now I am on my 2nd Tesla.

I loved driving an EV from the moment I received my BMW - for the acceleration, handling, quiet and more. I also am excited about the potential for EVs to help fight climate change.

The BMW had a very limited range of under 90 miles, making it impractical as a long-term option. Tesla improved on this and more, with even faster acceleration, better handling, and a target range of 260 miles for my first Tesla (and over 300 for the second). Current Tesla models have target mileage as high as 400 miles.

But I remained one of very few people in the US owning an EV for most of the past 10 years. The up-front cost of an EV was out of reach for most Americans. Range anxiety was a real issue in the early days, when range was limited and charging locations even more so. I recognized that over time there would be significant savings on fuel, oil, and servicing (which EVs need very little of), but that is not the way most people approach the purchase of major items (including cars and appliances).

Things have begun to slowly change. In 2014, the year of my first Tesla, Tesla sold 32,000 cars worldwide (about 53% in the US). In 2021 they sold 936,000 cars worldwide (with 38% of those in the US). Determining total sales of electric-only vehicles (sometimes referred to as BEVs) is somewhat difficult because most reports include hybrid vehicles under the EV header – including non-plug-in hybrids. The data I was able to pull together suggests that worldwide BEV sales in 2021 were about 2.7 million, up more than 80% over 2020. (This is out of total EV sales of 6+ million as more commonly reported). This represents ~ 4% of total worldwide car sales of 66.7 million. Tesla represented 35% of worldwide EV sales, with Chinese automakers in the number 2 and 3 slots. US sales of EVs in 2021 totaled 487,000, with Tesla achieving a 73% market share.

The traditional car companies have been slower – than even they expected – in releasing all electric cars, but that appears to be on the verge of change. Ford will be releasing the electric version of their best-selling F-150 truck (Lightning) in 2022, a year later than planned. They already have 200,000 orders and have stopped taking new ones. Ford has also recently re-organized their company to create a totally separate division for electric vehicles so that they can be more focused on that segment. Several other car companies, including Nissan, have announced releases of new EV's in 2022. And the rollouts should accelerate after that.

BMW has reported that they will be increasing the number of EVs produced by 50% a year and expect EV's to represent 50% of their sales by 2030. Volvo has announced that they will be completely converted to electric by 2030. GM has targeted 2035 for the same goal. Honda has indicated that 40% of their cars will be EV or hydrogen by 2030 and that all new gasoline cars will be phased out by 2040. VW announced that 70% of sales in Europe and 50% in the US will be electric by 2030, and gasoline-

powered cars will be phased out entirely by 2050. Mercedes reports that there will be no new models other than electric starting in 2025. And so on.

Wider availability of EV models – and wider knowledge about and acceptance of EVs – have made quite a difference, as have longer ranges and wider availability of charging stations. But there is still resistance. A 2021 survey by the Consumer Technology Association reported that 53% of respondents feel that EVs are not reliable; 64% feel that they are too expensive; and 88% believe there are simply not enough charging stations. Although there have been some reliability issues – particularly at Chevrolet - reliability has not really been a major EV issue. Let's tackle the latter 2 issues, starting with the number of charging stations.

Although there are some very conflicting accounts, according to the US Department of Energy there are now more than 50,000 public charging stations in the US, with approximately 150,000 charging ports – up considerably from 2 years ago. In contrast, there are about 168,000 gas stations in the US with about 1.5 million pumps.

While that sounds like a major difference, looked at from another angle one could argue that EV charging stations are *overrepresented*. EV sales represented 4% of all car sales in 2021 – but EV charging ports represent 10% of all fueling facilities in the US? Moreover, a considerable portion of current EV owners rarely use public charging stations, relying instead on home chargers (or plugging in to 240V or 120V power outlets at home).

However, the story is actually more complex. Of the EV charging stations, more than 85% are Type 2 chargers that may deliver at most 30 miles of range per hour of charging – making them much less effective than gas pumps and much less practical for supporting long trips.

The remaining EV chargers are Type 3 units that can now deliver up to 200 miles or more with an hour of charging – although the amount varies widely based on the EV model. Tesla is claiming 200 miles in 15 minutes for their newer charging stations and car models, while some EV's cannot use a Type 3 charger at all since their batteries are too small. Type 3 chargers are still slower than the gas pump, but charging speed has and is continuing to increase.

Of the almost 7,000 Level 3 charging stations in the US, about 25% are Tesla “superchargers”. And this represents an issue. All other American and European carmakers have followed an international standard charging protocol (SAE J1772); Tesla has not. Tesla has since placed the protocol they use into the public domain and expect other automakers to begin offering adaptors starting in 2022. (Tesla has always offered adaptors to enable their cars to charge anywhere). Tesla will be starting to allow non-Tesla vehicles to use their chargers shortly in a number of pilot locations. (Apparently non-Teslas will be charged a higher fee). But until this becomes more widespread, Teslas stations are not usable by other cars.

So, charging remains a valid concern. But this will be addressed in the coming years in a number of ways. First of all, we are already seeing a rapid rollout of charging stations at shopping centers, restaurants, and other places where drivers can charge their vehicles while doing other things. (This is something not available for gasoline-powered vehicles). Second, advancements continue to be made to the speed of Type 3 chargers, and advances in battery technologies are likely to add significant mileage

to EVs over the next 5 or so years. Finally, a rapid expansion of EV charging stations continues, and that will significantly accelerate with the recently passed Infrastructure act, which calls for 500,000 EV charging points to be built at a cost of some \$7.5 billion. (It is unclear how many of these can be Type 3 chargers).

Finding locations to install a charging station and getting the necessary approvals could prove challenging as we start to see a rapid increase in the number of locations. And there are questions about whether chargers will be made widely available in minority and low income neighborhoods. But two developments could address these concerns. First, we are starting to see gas station operators expressing interest in adding EV chargers. This is likely to take a while to really take off because of cost and the question of how to accommodate drivers who will need to be while the vehicle charges, but it makes a lot of sense as EVs begin to represent a much larger market share.

Second, a number of electric utilities are experimenting with utility-pole mounted charging stations, with pilot projects underway in California, Oregon, and Massachusetts and several more set to get underway shortly. Pole-mounted chargers have been more widely used in Europe, with 3,500 installed in London and Shell subsidiary Ubitricity is targeting 50,000 such chargers by 2025 in the UK. But these are on streetlight poles (utility lines are for the most part underground in England). While we may see this happen in the US, utility poles represent a better option because of the fact that power is readily available and accessible. Both streetlight and utility pole chargers have been shown to be much less expensive to install than a dedicated EV charger.

So that leaves cost as a major sticking point. Costs can be expected to decline somewhat as more models are introduced – and built - by more car manufacturers. Greater mileage means that the lifetime cost of owning an EV will decline.

And, with the sudden rise in the cost of gasoline in 2022 the lifetime cost of owning a gasoline car is increasing just as the lifetime cost of owning an EV is declining. Hopefully the spike in gasoline prices will be reversed quickly, and the shift to EVs will drive down the demand for gas which may further lower the price. But more and more people are realizing that lifetime operating costs matter. So as more and longer range EVs become available, charging stations continue to proliferate, and gasoline prices remain high we can expect sales of EVs to accelerate rapidly.

Starting in 2022.