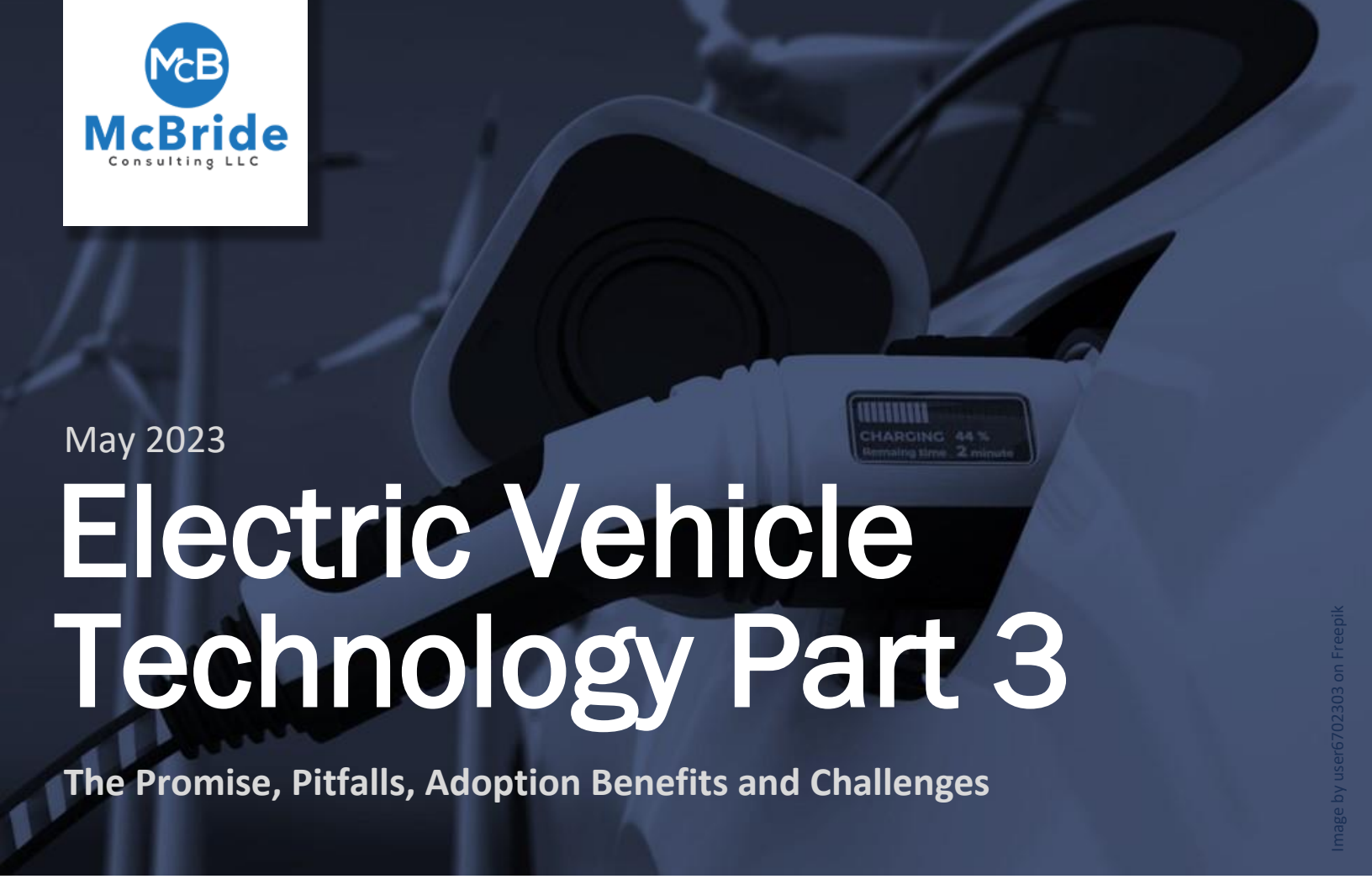

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Electric Vehicle Technology Part 3

The Promise, Pitfalls, Adoption Benefits and Challenges

Editor's Note: This is the third in a 4-part series from McBride Consulting covering the promise, pitfalls, and adoption of Electric Vehicles. The shift from internal combustion engines to battery powered conveyance will be highly consequential for societies around the world. This shift offers many advantages, but it is not without tradeoffs for the planet and challenges for individuals and governments alike. In this series, McBride consultants examine the good, bad, and uncertain aspects of the biggest change to wheeled transportation in over 100 years and the impacts it will have on all of us.

As Electric Vehicle (EV) consumers shift from early adopters to the early majority of owners, detailed questions and quality of life demands will be posed to the electric vehicle industry during this transition. America will gear itself up to reach the goal of 50% new vehicle sales being electric models in the next decade and consumers will adjust their purchasing research for their new car acquisition. They will ask questions such as, "Are costs easily comparable with so many different new selling points?", "How far can I drive?", "What alternatives are there to EVs?", and more.

One important area that lacks standardization, however, is the marketing metrics related to EV range. It is easy to market the max range of an electric vehicle because this tactic uses a frame of reference many Internal Combustion Engine (ICE) drivers are familiar with and then applies it to EVs. However, like smart phone batteries, not all EV ranges are the same. Many EV batteries are not recommended to charge past 80% of their maximum, and EV best practices include maintaining a charge between 20%-80% and limiting the use of rapid chargers. All of this requires more advanced planning in calculating day-to-day usage, especially since lithium-based batteries also lose charging capacity over time, not just over total distance.[1]

[1] https://www.drivingelectric.com/your-questions-answered/96/electric-car-battery-life-how-preserve-your-battery

Charging standardization, plugs and type of chargers also require serious consideration when buying an EV. Overnight charging can be done with Level 1 (AC, Wall Plug, 1kV to 7.5kV) and Level 2 (AC, Wall Plug, 240 V, J1772 adapter) systems, but if owners do not have a garage or consistent overnight parking, they need to find a public charging solution. Level 3 is a type of fast charging that can replenish a battery up to 80% in approximately 30 minutes, but it is recommended owners avoid that system for the long-term health of their battery. Furthermore, there are three different types of plugs for Level 3 in North America making public charging a challenge, while Europe has focused on a single standard known as CCS2.[2]

While the transition to an EV future has many questions and obstacles when it comes to standardization in the private sector, consumers can look to the public transportation sector for guidance. Jurisdictions and transit managers have a wealth of data on ranges, consistent usage, and facilities that support charging across their cities and towns. According to public transit authorities, in 2019 the number of passenger-rides on public transportation reached nearly 10 billion. Although those numbers dropped due to COVID-19, millions of Americans still depend on public transportation every day.

Public transportation has also been a tool to combat climate change by lowering the number of ICE cars on the road. Electrifying public transit is the next logical step in that evolution and one benefit of using EVs for public transportation is the time it takes to roll out new fleets and replace old ones is much shorter than the time it will take for every car on the road to become electrically powered. According to Scientific American, if every new car sold starting today was an EV it would still take 15 years to replace all remaining ICE vehicles. That means the United States will not reach their emissions goal by 2030.[3]

Public vehicle fleet turnover varies for each locality but will still be quicker and more efficient than replacing individual ICE cars. Electric buses also have lower maintenance costs and longer expected service lives than their gas counterparts. Montgomery County, Maryland, for example, made the transition to electric buses for its school fleet and plans for all county buses to be electrically powered by 2026. Transitioning the power grid to handle increased demand for the new buses was not an easy challenge, but with help from private sector partners the county was able to manage the transition and even developed a micro power grid which brought additional benefits including overall power delivery stabilization.[4]

Ten years from now, there will be more EVs on the road than ever before, but the transition to electric vehicles can be smoother for public sector entities. With high level planning from the municipality, battery monitoring is managed based on bus routes and utilization. The ability to bulk purchase also reduces the variances in plugs and allows municipalities to manage charging points. That also means the successes and lessons learned from public infrastructure EV development can assuage individual consumer concerns and then spur EV demands across both public and private domains.

Be on the lookout for the fourth part of this series where McBride consultants examine the infrastructure and capacity challenges in transitioning from internal combustion to electric powered vehicles.

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[2] https://www.theverge.com/2022/11/11/23453587/tesla-connector-north-american-standard-ccs-combo
[3] https://www.scientificamerican.com/article/better-bus-systems-could-slow-climate-change/
[4] https://cleantechnica.com/2022/11/02/americas-largest-transit-bus-charging-station-microgrid-opens-in-maryland/