The Social Construction of Electric Vehicles in Work Fleets

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

Benjamin Michael Weisel

Spring, 2022

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

Bryn E. Seabrook, Department of Engineering and Society

Introduction: The Rise of Electric Vehicles

While electric cars currently only make up 3% of worldwide car sales, they are predicted to overtake traditional gas-powered vehicles and make up 58% of all vehicle sales by the year 2040 (Kopestinsky, 2021). This increase in interest is not just among the general public, but among corporations and government organizations as well. Large businesses' main goals are to turn a profit, while government institutions aim to accomplish tasks while staying within a set budget. Despite this, both groups are investing in vehicles that do not yet compare to traditional cars in terms of mileage, infrastructure, and general reliability, all aspects that aid cost efficiency (Lemme et al., 2019). Electric vehicles (EVs) are an important step in reducing the emission of fossil fuels, as they do not burn gasoline like traditional internal combustion engine vehicles (ICEVs). Analyzing the root cause of their demand in fleets is crucial in looking at the future of their relevance, and can be done so using the social construction of technology (SCOT) framework. How can the increased interest in electric vehicles among work fleets, both corporate and governmental, be attributed to socially constructed desires?

Research Methods

This paper presents evidence from a variety of news articles and journal entries in order to demonstrate relevant details on EVs. SCOT is utilized to determine whether electric vehicle interest among fleets is socially constructed, with references to the original Bijker and Pinch paper that developed the framework, as well as more modern journal entries that use SCOT in their arguments for newer technologies. Interpretive flexibility, the idea that technology has different uses across various social groups, is briefly introduced as the first component of SCOT. Next, relevant social groups regarding the technology are analyzed, including the automakers, the general public, corporate organizations, and government organizations. A thorough

examination of case studies in this section aims to provide evidence for the answer to the research question. Finally, closure and stabilization are briefly discussed based on the previous analysis of relevant social groups, in order to determine whether the technology has solved the problem it was created to address. By demonstrating the worldwide interest in this technology as well as discussing the drawbacks of electric vehicles, the main research question is answered.

The Pros and Cons of Electric Vehicles

The transportation industry makes up 20% of worldwide energy usage, and is responsible for nearly 25% of total CO2 emissions (Huang et al., 2018). Of these emissions, 75% are emitted specifically from road transportation, and the numbers are only increasing as the population and global economy grow. Electric vehicles are the most realistic solution to this problem, as they are far more environmentally friendly than traditional vehicles—the total emissions from a small gas car will "surpass those of a small EV after roughly 27,000 miles of driving" according to models developed by automotive consulting firm FEV (Carty, 2021). Though the batteries inside of EVs are energy-intensive to manufacture, the low emissions from the vehicles themselves ultimately prove that they are a valid fix to the problems of fossil fuel depletion and climate change.

Despite the environmental benefits of electric vehicles, there are significant hurdles they still need to overcome, including mileage, infrastructure, and the lack of well-established technology when compared to ICEVs. In terms of range, EVs depend on a multitude of factors, including average temperatures, climate, and type of driving environment (city vs. highways). An electric car has a range of just 150+ miles when driven solely in the city, and up to around 250+ when driven primarily on highways in good weather conditions (Carty, 2021). Anyone attempting to drive over 300 miles without taking long fueling stops should not consider using EVs. Additionally, traditional vehicles have a much more established infrastructure. There are

around 136,400 gas stations in the U.S., but only 43,800 electric charging stations. It also takes over 45 minutes to fully charge an EV, which is often too time-consuming for the general public (Sullivan & Taylor, 2021). Congress has budgeted $7.5 billion towards charging stations alone, but it will be a long time until the infrastructure for EVs will rival that of ICEVs.

Although solutions to these problems are still being developed, there is growing interest among corporations and government organizations in EVs. New York City announced an ambitious plan to invest in electric vehicle replacements throughout their fleet, in addition to the infrastructure that goes along with this proposal ("Climate Week," 2021). The interest is not limited to America either; U.K. delivery service Evri (formerly known as Hermes) has ordered hundreds of EVs to add to their delivery fleet this year (Baker, 2021). Even the largest company in the world, Amazon, has ordered 100,000 electric delivery vans from EV producer Rivian to replace half of their fleet (Domonoske, 2021). These investments pose the questions of why this increased interest in EVs is happening in these sectors, and if the desire for an electric fleet has been socially constructed.

The Importance of SCOT

The social construction of technology is the theory that humans and society shape technology. This framework consists of various components, one of which is relevant social groups. For the purposes of this project, the relevant groups include vehicle fleets (both commercial and public), as well as EV manufacturers and the general public. Another component of SCOT is the "wider sociocultural and political milieu in which artifact development takes place" (Klein & Kleinman, 2002). The implementation of electric vehicles in fleets around the world is an example of the wider context of the technology.

The SCOT framework has been used in previous research to analyze the social construction of automobiles in rural America (Kline & Pinch, 1996). The authors cite how families in the American countryside began to define the car as a source of power in the early 20th century. Farmers would remove the seats of their cars in order to turn the vehicle into more of a small truck—influencing the development of pick-up trucks. By looking at "farm people's" influence on the evolution of cars and trucks, the researchers aimed to shift from the "traditional focus from the producers of technology… to the users of technology" (Kline & Pinch, 1996). In this case, farmers are stated to be the main relevant social group, while the wider context is the change that occurred in the automobile industry as a result of rural American's car usage—similarly to the larger context of the auto industry when looking at the growth of electric vehicles using the same framework.

SCOT has also been used to look at the growth of online food delivery services becoming more popular in the past decade, specifically in a paper analyzing the growth of companies like Cak Ed becoming extremely prominent in Indonesia (El Madja, 2021). The author cites how the social desire for efficiency has resulted in the development of more food delivery websites and apps, to the point where people are able to order medical drugs and groceries in addition to just food. This paper is unique in that it focuses on specifically on the growth in Indonesia, but its ideas could easily be applied to several other first-world countries. El Madja chooses to focus on a more modern technology, which is similar to the newer technology of EVs, and many of the points he makes are relevant to the electric vehicle discussion. Using the SCOT framework will shape the answer to the research question concerning the social construction of EVs.

Results: The Application of SCOT to Fleet EVs

By using the SCOT framework to analyze how different relevant social groups are involved with the recent increase in fleet electric vehicles, this growth is a socially constructed desire. Solely looking at vehicle performance, there is not currently a defining logical reason for electric vehicles to be utilized in any work fleet, corporate or governmental. The primary reason organizations are switching over to EVs is because of their environmental impact when compared to standard internal combustion engine vehicles, in an effort to contribute to fighting climate change. Without this knowledge of EV's eco-friendly nature, there would be no real justification for the presence and wide-spread popularity of this technology in work fleets, leading to the conclusion that the interest is entirely socially constructed.

The SCOT research methodology consists of two main stages: interpretive flexibility, and closure. Interpretive flexibility means that a given technology has different interpretations and uses across various groups, as well as "flexibility in how artifacts are *designed*" (Pinch & Bijker, 1984). In the case of electric vehicles, there are many different reasons that an individual, or an organization, would want to invest in them. For some, EVs are a way to reduce their fossil fuel usage and positively impact the environment. For others, switching to EVs is beneficial because they require much less maintenance than ICEVs, lacking oil changes or the need to replace brakes as frequently. There is also flexibility within how EVs are designed, with some manufacturers like Mercedes focusing on making more expensive luxury EVs, while companies like Nissan aim to make electric cars that are more accessible to the general public (at the cost of range) (Oldham, et. al, 2021).

The best way to analyze interpretive flexibility of a technological artifact is to look into their relevant social groups, as "a problem is defined as such only when there is a social group

for which it constitutes a problem" (Pinch & Bijker, 1984). The first relevant social group involved with EVs are the producers of the very technology, the vehicle manufacturers. Automobile companies like Tesla and Rivian are known for solely making electric vehicles, while many established manufacturers are increasing their EV output in addition to their standard vehicles—including Nissan, GMC, Audi, Volvo, Mercedes, and dozens more. Car companies are always looking to the future when developing products, demonstrated by the yearly updates to models across all major automakers. The fully electric vehicle is the largest development in the auto industry since hybrids became popular in the 1990s, and almost every major manufacturer is taking this opportunity to step into what is seen as "the future" of automobiles.

Vehicle producers are aiming to create eco-friendly vehicles—Tesla, perhaps the most well-known EV manufacturer, states that "the faster the world stops relying on fossil fuels and moves towards a zero-emission future, the better" (About Tesla, 2022). The company made $5.5 billion in 2021, officially making their cumulative earnings profitable since Tesla's creation in 2003 (Krisher, 2022). However, most electric vehicles are sold at high prices in order to be profitable, currently costing around $10,000 more on average than ICEVs (Winters, 2021). Most established automakers are having trouble reducing prices of their EVs due to the higher cost of electric batteries, and are presently relying on their gas-powered vehicles for a majority of their profits.

The higher upfront cost is a problem for some users of this technology, which includes the general public, as well as corporate and government fleets. However, electricity costs much less than gasoline (currently $1.16 per eGallon compared to $3.59 per gas gallon) meaning that EVs can be financially superior to ICEVs after some time (Leistikow, 2021). This economic decision has the general public split—a YouGov poll for Forbes magazine revealed that 30% of

Americans surveyed would consider an EV due to its reduced cost of fuel, while 32% say they would not consider one because of its higher initial cost (Howard, 2021). The number one reason people said they would purchase an EV is to protect the environment, with 45% of participants holding this sentiment—other common answers included "future proofing," the silence of the vehicles, and aesthetics. Many of these choices seem to be rooted in some sort of social reasoning, such as the aspiration to be eco-friendly. The global desire to personally reduce fossil fuel usage over the past few decades has led to the development of the electric vehicle, and this desire is still the main selling point to many consumers.

The electric vehicle's popularity among the general public is socially constructed, but this relevant group has different characteristics and desires from the main group of concern: vehicle fleets. While the public's opinions can be easily found and organized via surveys, it is much more difficult to openly understand the rationale behind corporations and government organizations. Major corporations have the ultimate goal of staying in business and making a profit, preferably with an increasing revenue in order to expand the business. Government organizations exist to serve their voters, but must do so within tight budgetary constraints, so they similarly share a will to put financials ahead of most other goals (though they are arguably less stringent than businesses). It is crucial to look at how electric vehicles being inserted into these organization's fleets helps them achieve their main goals, in order to determine if their desire for electric vehicles is socially constructed, or if this evolution in fleet technology was guaranteed to happen.

Relevant Social Group: Corporations

The most prominent example of corporations increasing the size of their electric fleets is none other than the most valuable business in the world: Amazon (Burdet, 2021). Amazon, a

company mainly known for its monopoly on e-commerce, has pledged that half of their deliveries will be carbon-neutral by 2030, which is part of a larger plan to be net-carbon-neutral by 2040 (Weise & Boudette, 2022). EV manufacturer Rivian has promised to produce 100,000 electric delivery vans for Amazon by that deadline. The scale of the company's EV expansion is global, with orders placed for 1,800 EVs from European manufacturer Daimler, and 10,000 from Indian automaker Mahindra. Amazon claims they aim to "build the largest E.V. fleet and charging network in the world," and is also putting significant research into delivery routes and battery efficiency to ensure the vehicles do not need to be charged during delivery shifts.

Amazon has already developed as a business in large part to societal influence. For example, the development of Prime Video and Amazon Music were a response to the success of other movie and music streaming services, and the societal desire for low-cost content streaming. The expansion of Amazon delivery's infrastructure in general has been due in large part to COVID-19, which led to an increase in consumer online spending by 60% following the start of the pandemic (Semeuls, 2020). This infrastructure includes six times the amount of delivery departments they had pre-pandemic, and around 175,000 of their own delivery vans, as the company aims to shift away from using established carriers such as UPS (Weise & Boudette, 2022). Amazon's business ventures are very good at capitalizing on what society desires, or what Amazon believes society *will* desire in the future, and utilizes their brand name and substantial budget to become proficient in various spheres of influence.

Based on the corporation's track record, it is clear that Amazon's venture into electric delivery vehicles is yet another reaction to something society wants—an eco-friendly future. As global concerns about climate change grew, Amazon co-founded The Climate Pledge initiative in order to achieve net-zero carbon emissions by 2040 (*Amazon Sustainability Report*, 2022).

The technological artifact that is the electric vehicle was not created in a vacuum, but was instead developed and gained commercial relevance due to large companies like Amazon using it to further their environmental incentives. Without these lofty goals, it is unlikely that electric vehicles would see much use over ICEVs when it comes to delivery, as the heavier loads prove to multiply operational and technological challenges.

There is a widespread desire amongst large corporations to go green, and Amazon is just a reflection of how several other companies are involving EVs in their fleet operations. FedEx has similar plans to purchase tens of thousands of EVs for their fleet by 2030, aiming to have around 250,000 in total by that year. Walmart, in efforts to expand their own delivery infrastructure, are purchasing 5,000 electric vans to put into service by 2023 (Weise & Boudette, 2022). International companies are no different, with UK-based delivery company Evri also purchasing several hundred electric vans. Evri's head of fleet operations, David Landy, admitted that "whichever way you look at it – whether in terms of range, payload or volume – a van with an internal combustion engine beats an electric one hands down," expressing his belief that the transition will be difficult, but added that their overall goal with the endeavor is to lower tailpipe emissions (Baker, 2021). These cases demonstrate that the initiative to "electrify" corporate fleets is due to social desires regarding environmentalism, even if it means spending time, money, and effort on expanding this new technology.

Relevant Social Group: Government Organizations

In addition to corporations expanding their electric vehicle presence, government organizations are also setting lofty goals to include EVs in their fleets, both at the local and federal level. In 2021, New York City mayor Bill de Blasio announced a $75 million investment in EVs and EV infrastructure, to include 300 electric replacements for ICEVs, 275 fast vehicle

chargers, and 78 electric ambulances, amongst other proposed additions (*Climate Week*, 2021). Mayor de Blasio specifically states climate change as the main reason for this investment, calling it an "existential threat facing our city, our nation, and our world," adding that they want to "contribute to a greener future for the next generation." The reasoning for adding EVs to the NYC public fleet is clear, and it proves that without the societal desire for a zero-emission future, the technology would have no place in these work forces. This large portion of the city's budget would have typically been used to add more ICEVs to their fleet, but recent desires to combat climate change have altered the traditional government budget. Other major U.S. cities such as Houston and Cincinnati are following a similar plan in order to reduce carbon emissions, with the former spending $22 million on 22 electric buses, and the latter specifically aiming to have a 100% electric fleet by 2035 (Jordan, 2022), (Gutzwiller, 2022). Both city's mayors have similarly cited climate change as the driving force behind these initiatives, further demonstrating the social construction of the electric vehicle among government fleets.

The U.S. federal government is also increasing the addition of EVs to their fleet of 650,000 total vehicles, though budget constraints have led to problems. President Biden has announced a plan to acquire 100% zero-emission vehicles by 2035, in an effort towards having zero emissions across the entire federal government by 2050 (Government Fleet Staff, 2021). In 2021, the U.S. Postal Service (USPS) was promised a $482 million contract to purchase new delivery vehicles, as they make up almost a third of the entire federal fleet (Naylor, 2021). However, Postmaster General Louis DeJoy stated that only 10% of the organization's new trucks would be electric, adding that they would need almost $4 billion more in order to "electrify" the rest of the fleet.

The USPS is facing social pressure from both the general public and the presidential administration to rethink their future plans. The Environmental Protection Agency's associate administrator for policy, Vicki Arroyo, commented that "purchasing tens of thousands of gasoline-fueled delivery trucks locks USPS into further oil dependence, air pollution and climate impacts for decades to come, and harms the long-term prospects of our nation's vital mail provider" (Katz, 2022). This backlash indicates that organizations that continue to utilize ICEVs over EVs will be harshly criticized for not doing their part in reducing CO2 emissions. The USPS plan also shows how expensive and time-consuming it can be for such large organizations to invest in this new technology, which is a testament to how dedicated the government is towards clean energy. The expectation for government organizations to combat climate change has grown immensely in the 21st century, and this pressure further proves how the expansion of electric vehicles in fleets is a response to societal desires. Without government sustainability initiatives, the electric vehicle would be obsolete in their fleets.

Closure and Stabilization

Following the analysis of interpretive flexibility and relevant social groups, the second part of the SCOT framework involves looking at the closure of the technology. Closure in technology involves "the stabilization of an artifact and the 'disappearance' of problems… whether the relevant social groups *see* the problem as being solved" (Pinch & Bijker, 1984). Since electric vehicles are only recently gaining popularity around the world, it is clear that none of the relevant social groups see the problem as remotely "solved." The problem at hand, climate change, is still something that both the general public and organizations see as pertinent, and thus explains the expanded usage of this technology in recent years. As seen in the case studies, the issue has been cited by policy makers, corporate higher-ups, and even the manufacturers of the

technology itself, as the sole reasoning for the growth in EVs. The problem cannot yet be redefined either, as EVs were initially invented as an environmentally friendly alternative to ICEVs, and they remain as such to all relevant social groups. It is unknown how long it will take for electric vehicles to realistically contribute to the reduction of climate change, but any form of closure regarding EVs will certainly not happen for several decades.

Limitations and Future Research

Some of the limitations of this project include the fact that it is difficult to determine whether certain corporations are genuinely interested in environmental progress, or if the efforts are being made for publicity. Based on the scale and ambition of the projects analyzed, it is likely that these initiatives are planned out of a genuine concern for the environment, though it cannot be confirmed. The answer to this dilemma does not affect the research question at hand, however, as corporate EV plans support the conclusion that the fleet electric vehicle is a socially constructed technology. Another limitation is the exclusion of more specific social groups, such as advertisers and insurance companies. The research question focuses on corporate and government fleets, so these other social groups are likely not relevant. Future research could include more social groups, possibly analyzing the relation between EVs and insurance companies, or advertisers. The technology is still in its early stages, so a future project could look more closely at how fleet EV initiatives have played out, and the effects of EVs in fleets.

Conclusion: Fleet EVs are a Social Construction

Electric vehicles are quickly growing among not just the general population, but corporate and government fleets across the planet. Through use of the SCOT framework, it is concluded that the use of EVs in fleets is in fact a social construction. Without the social desire to combat climate change and reduce vehicle emissions, organizations would have little reason to

make the time-consuming and expensive transition towards electric fleets. Despite the downsides of EVs, work fleets are transitioning to this technology out of the social desire to do their part in reducing their carbon footprint.

References

About Tesla. (2022). Tesla. https://www.tesla.com/about#:%7E:text=Tesla%20was%20founded%20in%202003,to%20drive%20than%20gasoline%20cars.

Amazon Sustainability Report. (2022). About Amazon. https://sustainability.aboutamazon.com/

Baker, E. (2021, September 30). *Hermes commits to electric vehicles for UK fleet*. Parcel and Postal Technology International. https://www.parcelandpostaltechnologyinternational.com/news/vehicles-fleet/hermes-commits-to-electric-vehicles-for-uk-fleet.html

Burdet, N. (2021, June 21). *What are the most valuable global brands in 2021?* Kantar. https://www.kantar.com/inspiration/brands/what-are-the-most-valuable-global-brands-in-2021

Carty, S. (2021, July 7). *Why Should I Care about EVs? and 19 Other Things You Want to Know about Electric Vehicles*. Car and Driver. https://www.caranddriver.com/features/a36876962/20-questions-about-evs/

Climate Week: City Announces $75 Million in new Investments for Electric Vehicles and Electric Vehicle Charging Infrastructure. (2021, September 22). NYC. https://www1.nyc.gov/office-of-the-mayor/news/639-21/climate-week-city-75-million-new-investments-electric-vehicles-electric

Domonoske, C. (2021, March 17). *From Amazon To FedEx, The Delivery Truck Is Going Electric*. NPR. https://choice.npr.org/index.html?origin=https://www.npr.org/2021/03/17/976152350/from-amazon-to-fedex-the-delivery-truck-is-going-electric

El Madja, N. (2021). New Media and Social Construction of Technology (SCOT) on Cak Ed Online Delivery Service in Lamongan Regency. MUHARRIK: Jurnal Dakwah Dan Sosial, 4(01), 79-95. https://doi.org/10.37680/muharrik.v4i01.819

Government Fleet Staff. (2021, December 8). *Biden Calls for All Federal Fleet Purchases to be ZEVs by 2035*. Government Fleet. https://www.government-fleet.com/10157528/biden-calls-for-federal-fleet-to-purchase-all-zevs-by-2035#:%7E:text=On%20Wednesday%2C%20President%20Joe%20Biden,achieve%20zero%20emissions%20by%202050.

Gutzwiller, L. (2022, March 18). *Cincinnati to purchase only electric vehicles with goal of having 100% electric fleet by 2035*. WLWT News. https://www.wlwt.com/article/cincinnati-electric-vehicles-2035/39478875

Howard, B. (2021, October 8). *Survey: 23% Of Americans Would Consider EV As Next Car*. Forbes Wheels. https://www.forbes.com/wheels/features/ev-survey/

Huang, Y., Ng, E. C. Y., Zhou, J. L., Surawski, N. C., Chan, E. F. C., & Hong, G. (2018). Eco-driving technology for sustainable road transport: A review. Renewable and Sustainable Energy Reviews, 93, 596–609. https://doi.org/10.1016/j.rser.2018.05.030.

Jordan, J. (2022, March 17). *Houston Metro will add 20 electric buses to its fleet in 2022*. Mass Transit. https://www.masstransitmag.com/bus/vehicles/hybrid-hydrogen-electric-vehicles/news/21260702/tx-houston-metro-will-add-20-electric-buses-to-its-fleet-in-2022

Katz, E. (2022, February 23). *The Postal Service Has Rejected Biden's Push for More Electric Vehicles*. Government Executive. https://www.govexec.com/management/2022/02/postal-service-has-rejected-bidens-push-more-electric-vehicles/362331/

Klein, H. K., & Kleinman, D. L. (2002). The Social Construction of Technology: Structural Considerations. *Science, Technology, & Human Values,* 27(1), 28-52. https://doi.org/10.1177/016224390202700102

Kline, R., & Pinch, T. (1996). Users as Agents of Technological Change: The Social Construction of the Automobile in the Rural United States. Technology and Culture, 37(4), 763–795. https://doi.org/10.2307/3107097

Kopestinsky, A. (2021, August 12). *Electric Car Statistics and Facts 2021 | Policy Advice*. PolicyAdvice. https://policyadvice.net/insurance/insights/electric-car-statistics/

Krisher, T. (2022, January 27). *Tesla posts record profit, won't produce new models in 2022*. ABC News. https://abcnews.go.com/Business/wireStory/tesla-posts-record-profits-deliveries-soared-2021-82494026

Leistikow, D. (2021). *The eGallon: How Much Cheaper Is It to Drive on Electricity?* Energy.Gov. https://www.energy.gov/articles/egallon-how-much-cheaper-it-drive-electricity

Lemme, R., Arruda, E., & Bahiense, L. (2019). Optimization model to assess electric vehicles as an alternative for fleet composition in station-based car sharing systems, Transportation Research Part D: Transport and Environment. *Transportation Research Part D*, *7*, 173–196. https://doi.org/10.1016/j.trd.2018.11.008.

Naylor, B. (2021, March 10). *When It Comes To Clean Energy, USPS Delivery Trucks Don't Yet Answer The Mail*. NPR. https://www.npr.org/2021/03/10/974901459/when-it-comes-to-clean-energy-usps-delivery-trucks-dont-yet-answer-the-mail

Oldham, S., Irwin, A., & Fink, G. (2021, February 11). *Here's Every New Electric Vehicle Model for Sale in the U.S.* Car and Driver. https://www.caranddriver.com/shopping-advice/g32463239/new-ev-models-us/

Pinch, T. J., & Bijker, W. E. (1984). "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." *Social Studies of Science*, 399–441.

Semuels, A. (2020, July 28). *Many Companies Won't Survive the Pandemic. Amazon Will Emerge Stronger Than Ever*. Time. https://time.com/5870826/amazon-coronavirus-jeff-bezos-congress/

Sullivan, B., & Taylor, H. (2021, August 24). *CNBC road test: The U.S. EV charging network isn't ready for your family road trip, let alone the expected wave of new cars*. CNBC. https://www.cnbc.com/2021/08/24/cnbc-road-test-the-us-ev-charging-network-isnt-ready-for-your-family-road-trip-let-alone-the-expected-wave-of-new-cars.html

Weise, K., & Boudette, N. E. (2022, January 18). *Can Anyone Satisfy Amazon's Craving for Electric Vans?* The New York Times. https://www.nytimes.com/2022/01/18/technology/amazon-electric-vans.html

Winters, M. (2021, December 29). *Here's whether it's actually cheaper to switch to an electric vehicle or not—and how the costs break down*. CNBC. https://www.cnbc.com/2021/12/29/electric-vehicles-are-becoming-more-affordable-amid-spiking-gas-prices.html#:%7E:text=The%20average%20transaction%20price%20for,an%20entry%2Dlevel%20luxury%20car.