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Could an EV Future by 2030 be a Shot in the Wrong Direction?

In recent years, the push for net-zero carbon emissions across the U.S. has compounded. Due to various landmark studies, it has been concluded that the burning of fossil fuels has begun to damage our environment, and warm our planet. In the effort to reduce our carbon emissions and eliminate the burning of fossil fuels, the regulatory bodies of the nation have turned to the automotive industry. The burning of fossil fuels in the engines powering our cars has been observed to be a large contributor to our carbon footprint, and must be replaced with a carbon-neutral solution to achieve our goals. However, when this switch must occur is a highly debated topic among scientists and politicians alike. And while this change is inevitable, putting it in place too soon would likely cause more harm than good to our nation.

In 1997, international automaker Toyota Motors released what would come to be known as the figurehead for hybrid vehicles, and the vehicle that would usher in a new generation of change for the automotive world. The Prius was initially released as a Japanese-exclusive vehicle and was only brought to the U.S. in 2001. The Prius's landmark innovation was a large, 310-volt battery located under the backseat. This battery, coupled to a 33 kW electrical motor, and mated to a one-speed planetary gearbox, made the Prius the first mass-market hybrid-electric vehicle in history. Following its second-generation switch to a more environmentally friendly combustion cycle, and to a liftback design, the Prius was met with worldwide success. Generating a never-before-seen 89 mpg, and emitting nearly zero carbon into the atmosphere, Toyota's newest

model had found a permanent spot on American roads. The commercial success and impressive functionality of the car's systems planted the idea that electric (EVs) and hybrid electric vehicles (PHEVs) could be a viable alternative to the internal combustion engines seen in most road-going cars. And with the Nissan Leaf in 2010 and the Tesla Model S in 2012, this future continued to become clearer. However, due to the recent concerns over the carbon emissions and environmental effects of internal combustion engines, or ICEs, the switch to an electric or hybrid vehicle is beginning to look like more of a requirement and less of a choice. And while many U.S. States have already enacted laws banning the sale of ICE-powered cars after 2035, many devout climate activists have set their ideal "phaseout date" closer to 2030. However, support of the movement to ban ICEs by 2030 could likely be placing too much support on the wrong causes. Banning ICEs by 2030 in favor of electric vehicles is severely unrealistic, as electric vehicle technology is not prepared for a country-wide switch, and could be a distraction from greater contributors to our carbon footprint.

Currently, the biggest arguments for the viability of electric vehicles on a large scale are presented as follows: they cost less in maintenance and are more reliable due to fewer moving parts, no fuel is required driving down costs for use, and they are entirely environmentally friendly as they emit no carbon emissions. While these may seem like attractive qualities to advertise as the standard for electric cars, the reality of the situation is not so simple.

As of 2024, the batteries used to power electric vehicles are made of an array of lithium-ion battery cells. And while the use of these technologies greatly contributes to their energy-storing capabilities, it is a wildly new technology in comparison to internal combustion engines. The technology behind the lithium-ion battery was initially discovered in 1976, with its first use in the energy market over 20 years following its conception (Pereira). Further, the

technology's first use in the automotive industry came even later, in 2006 as the Tesla Roadster. Being a greatly new technology, especially in the automotive world, it is only realistic for the technology to exhibit a variety of issues and shortcomings due to automakers' limited experience with the technology. And while on paper, electric vehicles, possessing nearly ten times fewer moving parts in their drivetrain alone, should be greatly more reliable than ICE-powered vehicles, this is not the case. In November of 2023, the multimedia company Consumer Reports, a consumer-based informational site that collects data and publishes trends in the automotive field, published a report on the reliability of electric vehicles. After a survey of over 330,000 vehicles throughout 2023, despite containing far fewer moving parts, electric vehicles exhibited an astounding 79% more reliability issues than conventional ICE-powered cars (Doyle). This large gap in reliability is due to automakers' unfamiliarity with the technology, as the primary problem areas for these vehicles were the transmission, electric motors, and batteries.

Further, even with regular maintenance and care of an electric vehicle, the presence of an electric battery means that all electric vehicles in use are on a timer. From the factory, electric vehicle batteries have a life expectancy of around 10-20 years . However, this is greatly reduced by a variety of unavoidable factors (Hawley). The first of these is the use of high-speed chargers, which can charge an entire electric battery in around 30 minutes, at the cost of overheating, which shortens the lifespan of your vehicle. Moreover, not only is temperature a detractor from a battery's lifespan but its range as well. A study on electric vehicle range in different temperature conditions conducted by Consumer Reports, found a variety of faults when operating electric vehicles outside of their ideal temperature of 70℉. According to their testing, they found that driving at highway speeds in 40℉ weather cut down around 25% of the vehicle's original range. Further, when the same test was conducted at around 80℉, the tested vehicles lost around 31% of

their original range. The report concluded that the largest temperature-based detractor from the range is a low-temperature trip with frequent stops requiring the reheating of the cabin, which would detract over 50% from the vehicle's original range (Bartlett and Pratt). This is primarily due to the temperature sensitivity of current battery technology, and the lack of an ICE to produce heat to warm the cabin.

To remedy these issues by the deadline of 2030, the technology behind electric vehicles would require intensive, and more costly research and development than automakers are currently conducting. However, this would likely not be possible, due to the already astronomical costs associated with EV research and development. At the beginning of 2024, multiple U.S. automakers associated with the production of electric cars reported extensive losses. Startup brands like Rivian and Lucid, two American EV startups, reported losses of $33,000 and $400,000 per car sold in 2023 respectively (Bellwood). This is not only limited to startup brands, however, as legacy automaker and world automotive leader Ford reported losses of around $40,525 for each of the 116,000 electric vehicles it sold in 2023 (Isidore). These losses are largely associated with the billions poured into research and development for electric vehicles, as the components to build electric vehicles are extremely costly. This works in tandem with the low profit margin generated by the sales of these vehicles, to generate billions in losses for EV brands and automakers alike. Further, a report from the Boston Consulting Group concludes that these losses are far from decreasing, as increases in scale and use of newer technologies will only decrease losses by around 50%. And with the rising costs associated with sourcing Chinese imports, it may as well be that American brands will continue to lose money on EV sales for the foreseeable future (Bellwood).

These losses are generally accrued in vain, as electric vehicles continue to be greatly more expensive to purchase than ICE vehicles, leading to a steady decline in sales. According to sales reports by EV automakers published in Q1 of 2024, the overall sales of electric vehicles in 2024 have fallen by around 15.2% when compared to sales in Q4 of 2023 (Cox Automotive). Falling sales, along with price cuts intended to make EVs more accessible, have dragged down general revenues across the board, with Ford reporting a plunge of 84% in their EV division in 2023, and even lead EV automaker Tesla reporting a 48% drop in earning in Q1 of 2024 (Isidore). Due to this, it is unfeasible for EV automakers to accelerate their research and development, only prolonging the rampant reliability issues and mile-high prices exhibited by EVs. A ban on non-electric vehicles by 2030 would leave the people of the U.S. with a greatly underdeveloped and expensive technology, and make it largely impractical for the average U.S. citizen to be able to purchase a vehicle. Even if someone could afford an Electric Vehicle in this case, the reliability issues associated with the vehicle would cost owners thousands in maintenance. This does not begin to explain the harm done to automakers, as profits from ICE-based vehicles would be completely cut off, leading to untold financial damage as losses continue.

Furthermore, the notion that the lack of fuel in electric vehicles will drive down operating costs in EVs is no longer true. In the first couple years of the introduction of the mass-market EV, it was entirely true that charging an electric vehicle was far less expensive than fueling a gasoline or diesel-based ICE vehicle. However, as EV ownership has begun to rise in recent years, so has the price of the electricity to charge them. In a report from CBS News in 2023, Irina Ivanova described this issue in its most severe location: New England. Ivanova writes that while gas prices in the region decreased, rates for energy have climbed an average of 30%. This is

especially bad for EV owners who charge at home, as some have seen their utility bills climb around 50% because of this (Ivanova). In many cases this has led to electric vehicles being more costly to fuel than the average ICE-powered vehicle.

While this is a large issue for residents of the East Coast, it is far less relevant than what is faced in the central region of America, as many states lack proper charging networks to support EVs. Currently, EV charging stations across many of the nation's middle states are few and far between. The U.S. Department of Energy reports that in some states like Montana, Idaho, Mississippi, and Louisiana, the number of public charging stations is less than 700 (Alternative Fuels Data Center). A full switch from ICE-based vehicles to EVs in this state would put millions of people across these states without charging stations, leading to thousands of dead vehicles running out of charge on public roads. And with each charging station requiring an average of 1-2 years to build, it is unlikely that thousands or even millions of stations could be built across the U.S. by 2030.

Finally, many climate activists base their support for electric vehicles on the notion that EVs emit zero carbon emissions, and are therefore carbon neutral. However, this fails to account for the source of the electricity used to power the network of electric vehicle charging stations, and therefore EVs. According to the U.S. Environmental Protection Agency, the nation's entire transportation industry only contributes around 15% of our total carbon emissions (Environmental Protection Agency). This is even less for the output of passenger cars and vans, which account for only 10% of the nation's total emissions (Tiseo). In contrast, the electricity generation industry in the U.S. is our largest contributor, accounting for over 34% of the nation's carbon footprint (Environmental Protection Agency). This is primarily due to the energy industry's continued use of coal and fossil fuels in energy production. In 2022, coal combustion

power generation accounted for over 55% of the energy industry's carbon output, while outputting less than 20% of the energy generated that year (Environmental Protection Agency). Mentioned previously, the large increase in energy costs in the New England area is associated with the strain on the region's methane-based power generation industry, another emitter of carbon gasses (Ivanova). This directly shows that a conversion to electric vehicles is useless if the power generation in our country is based on the burning of fossil fuels. If we, as a nation, continue to use carbon-intensive and wildly inefficient methods of power generation, we will never reach the net-zero carbon output that our nation is striving to achieve. Focusing on the civilian transportation industry first, and banning ICE-based vehicles, will have little to no effect on carbon output, as the increased demand for power in the U.S. will raise the use of fossil fuels to generate energy accordingly. Herbert Ginn, a professor of electrical engineering at the University of South Carolina conveyed this idea best, stating "Even if you have an electric vehicle, if it's powered with electricity from a coal-burning power plant, you haven't really done much to help the environment." (Farrar). Too much attention is being paid to a lesser contributor to our footprint, while the real climate danger is allowed to operate with little media coverage.

In conclusion, a complete ban on ICE-powered cars across the U.S. by 2030 would do more harm to the general public than good. The high prices and low reliability of electric vehicles would make driving wildly inaccessible for many people across the nation. Automakers would suffer billions yearly in losses from producing and researching electric vehicles, leading to a sharp downturn in the transportation economy, wreaking havoc on legacy automakers. And the increased energy demand would put further strain on the real climate killer, which is the energy generation industry. If regulatory focus in the U.S. was diverted to minimizing emissions in energy production rather than transportation, it would give the auto industry time to develop

technologies to make EVs both accessible and reliable. Further, decreasing the carbon footprint of the energy industry first would still allow a switch to EVs down the line. With a lowered carbon output associated with generating the electricity powering EVs, we could better achieve our goal of reducing our carbon emissions, and halt our contribution to the heating of our planet.

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