The Rise of Electric Vehicles as a Climate Solution

Around the world, the impacts of climate change are constantly growing and evolving, and as we experience effects like extreme weather events and reductions in crop yields, it has become increasingly evident that real and drastic changes must take place. Because the transportation sector accounts for around 28% of greenhouse gas (GHG) emissions by the United States and 24% globally, electric vehicles (EVs) are naturally seen by many as an effective strategy to tackle a large source of climate change (McKerracher, 2024). As the popularity of electric vehicles rises among consumers, policies regarding this potential climate solution are growing as well, helping to electrify the United States, decrease GHG emissions, and stimulate the car market with the advancement of new technologies. Paired with renewable energy sources, electric vehicles have significant potential to decrease the environmental impact of transportation.

As the market for electric vehicles continues to grow, many states have begun adopting related policies– incentivizing EV purchases, making them more accessible, offering charging rate reductions, and more. As it stands, only two states, Kansas and Kentucky, offer zero EV-related policies and incentives (Igleheart, 2023), while the vast majority of the US has recognized the potential of the EV market. Among many other states, California and Colorado have some of the most robust policies in place bolstering the position of the electric vehicle solution.

- California has some of the most ambitious and widely recognized climate-related policies in the United States, not just regarding EVs, but renewable energy, the whole transportation sector, and climate change in its entirety (tackled in part by their cap-and-trade program). Regarding EVs, the state of California aims for all new vehicle sales to be zero-emission vehicles by 2035, perhaps the most high-reaching EV goal set forth by any state. According to the California Air Resources Board, EV sales are skyrocketing, and dropping battery costs will eventually make EVs as widely accessible as internal combustion engine vehicles are today (Cohen, 2023). The plan will progress in increments over the next decade, with sales regulated to 60% EVs by 2030, up to 100% in 2035. California also has rebates for EVs to make purchasing these vehicles more attainable through the Clean Vehicle Rebate Project, tax exemptions on zero-emission buses for public transit, rebates for public charging infrastructure set forth by the California Electric Vehicle Infrastructure Project, and the Los Angeles Department of Water and Power even offers up to $1,500 back on the purchase of qualifying used electric vehicles (Igleheart, 2023). These policies, among many others in place, set the stage for vast improvements in decreasing emissions from transportation. Importantly, California also offers financing options for energy improvements with the Property Assessed Clean

Energy (PACE) Loss Reserve Program, which helps to target the issue of using nonrenewable (coal) power to charge a zero-emissions vehicle (Igleheart, 2023).

These initiatives operate on a statewide scale, but California shows possibilities of an extremely effective policy landscape, leading by example and encouraging other states to act similarly. Economically, Reuters reported that the state's EV rules should result in benefits of nearly $90 billion by 2040, hopefully influencing other states, as California has one of the biggest and most enviable economies in the world (Shepardson, 2024). Another very important consideration is that these policies must be examined through a lens of climate justice, and California has taken care to do exactly that. Not that these policies are foolproof by any means, but there have been many rules put in place to make the new EV policies equitable so that they might benefit all communities and not just the wealthy. Zero-emission public transit, rebates on used EVs, investments in accessible infrastructure, charging rate reductions, rebates for qualifying low-income individuals, etc. are all provisions in place as an attempt to ensure a just transition into clean transportation (Igleheart, 2023). In addition to these policy considerations, making EVs accessible to more communities increases the initiatives' chances for success.

- In Colorado, EV purchasers qualify for many credits and rebates (sometimes worth thousands of dollars) similar to those that make EV purchases desirable in California. This is all part of the state's broader climate strategy to reach 100% GHG emission reduction from 2005 levels by 2050, with the S.B.16 law enacted under Governor Polis (Gallo, 2023). Colorado also has benefits specific to different electric companies, such as Holy Cross Energy, which offers free or discounted EV chargers (Igleheart, 2023). In efforts to remove high-emission vehicles from Colorado's roads, the state has also implemented a vehicle exchange program offering up to $6,000 for those who qualify according to income requirements and whose vehicles either meet the age cutoff or fail emissions testing. Colorado's 2023 EV Plan, Executive Order B 2019 002, aims to have 940,000 light-duty EVs on the road in Colorado by 2030 (2023 Colorado EV Plan).

Colorado's plans, while perhaps not quite as robust as those in California, still represent important steps toward dramatic GHG decreases in transportation. Importantly, Colorado's plans are centered around equity, with initiatives like the Vehicle Exchange Program and rebates worth thousands making EV purchases more accessible, coupled with improvements in charging infrastructure.

On a federal level, the United States has made some important strides in recent years, though it may not be realistic to keep high hopes for further improvement in the near future, given the current political climate.

- The Inflation Reduction Act boasts EV tax credits and aims to bolster domestic manufacturing and supply chains, but the IRA has been criticized for loopholes that put the domestic economy at risk (due to a lack of regulation on where leased EVs should be manufactured) and for the simple fact that the policy did not incentivize EV sales enough among people who were not already EV purchasers (Allcot et al., 2024).

- In 2023, the Biden Administration announced the Made-in-America EV charging network plans, with the goal of building 500,000 public EV charging stations in the United States by 2030, funded by over $600 million in grants (Federal Highway Administration, 2024).

The electric vehicle policies in the United States are full of potential, but they have substantial shortcomings, too. For one, EV affordability is not yet at the point where it is accessible to all Americans, and the goals set forth to make only EVs available for purchase in just a few short years neglect to consider those who do not have the means to make this switch, especially those in rural areas where charging infrastructure is not suitable to sustain many new EV drivers. While policies offering tax credits and discounts on used EVs are helpful, this new era of transportation may still not be realistic for many. Additionally, there is the moral dilemma of EV manufacturing being very resource intensive, relying on materials obtained in foreign countries like the Democratic Republic of Congo, where cobalt mining has created an ongoing humanitarian crisis (Houreld and Bashizi, 2024).

Project Drawdown predicts that almost 10gts of carbon dioxide can be sequestered by 2050 with advancing EV technology. In order to maximize the potential benefits of electric vehicles as a climate solution, there are many possible avenues that the United States and the rest of the world could take. Just a handful of these considerations include:

- Focusing on equity-centered policies: anything that increases affordability and makes EV purchase and use more accessible to all communities will be beneficial in the eventual reduction of GHG emissions, and investing in widespread charging infrastructure will make it possible for rural communities to partake in these efforts.

- Investing in renewable energy: EVs themselves do not produce GHG emissions, however, burning coal to charge and EV does. As a country, the United States should focus on development of clean energy resources, especially given the economic benefits of these cheaper power sources.

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