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The Post-Pandemic Future for Electric Vehicles (EVs)

Introduction: The Rise of EVs in the U.S.

The future of Electric Vehicles (“EVs”) was something that was unclear a little over a decade ago. With the advent of the Great Recession, many were predicting that hybrid-electric vehicles would be competing with hydrogen-fuel cell technology and other forms of alternative fuel. Of course, EVs were in the mix, but mid-way past the last decade, Compressed Natural Gas (“CNG”) started to emerge as a viable option in the U.S. due in part to the country’s energy independence movement, an increase in the fracking business to provide local jobs, and increased fueling infrastructure (especially for truck and vehicle fleets and on the west coast in California). The Gold Standard for alternative fueled vehicles established by the California Air Resources Board (CARB), coupled with Federal laws and regulations with more stringent emissions standards during the Obama Administration, led to various efforts by manufacturers over the years to introduce increasingly more clean and efficient vehicles (*i.e.*, Super-Ultra Low Emissions Vehicles or “SULEVs”; and Ultra-Low Emissions Vehicles or “ULEVs”). So, across the board, while all vehicles have become cleaner and more fuel efficient, with federal emissions standards being met and exceeded, there is still a growing and revived sustainability political movement, with the stage being set by the “New Green Deal” plan put forward by U.S. Representative Alexandria Ocasio-Cortez and supported by U.S. Senator Bernie Sanders, and the Presidential election of 2020, which may determine the course of EVs during the next decade.

The environmental movement in the U.S., which started in the 1970s, did not gain mainstream or significant traction with respect to alternative fueled vehicles until the 2000s with the announcement of PlaNYC in New York, with many other cities developing sustainability plans, and with cities and private companies alike hiring Chief Sustainability Officers to “go green.”¹ Celebrities in Hollywood were driving to awards shows and around town in Toyota Priuses, and commercials and the fuel-efficiency of hybrid-electrics made economic sense before the Great Recession (and through it) due to the high cost of fuel in the 2000s. In the mid-2000s, as part of PlaNYC, former New York City Mayor Michael Bloomberg and I announced the hybrid-electric vehicle miles per gallon fuel-efficiency mandate for taxicabs, and later for for-hire vehicles, with other cities following suit.² The taxi industry brought a successful lawsuit against the Mayor, myself, and the New York City Taxi and Limousine Commission (“TLC”) to strike down the TLC’s mandate.³ In the interim, up to 63% of the TLC taxi fleet became hybrid-electric, and since 2018 there are more than 30,000 hybrid TLC vehicles on the road.⁴

¹ <https://www1.nyc.gov/office-of-the-mayor/news/119-07/mayor-bloomberg-presents-planyc-a-greener-greater-new-york>

² In 2008, San Francisco’s Clean Taxi Ordinance required taxi companies to reduce greenhouse gas emissions by 20% below 1990 levels. It increased the gate fee—the amount drivers pay cab companies to rent a vehicle—and allow companies to charge an additional \$7.50 charge if the cab is a green cab. <https://www.sfmta.com/getting-around/taxi/top-6-reasons-take-taxi>

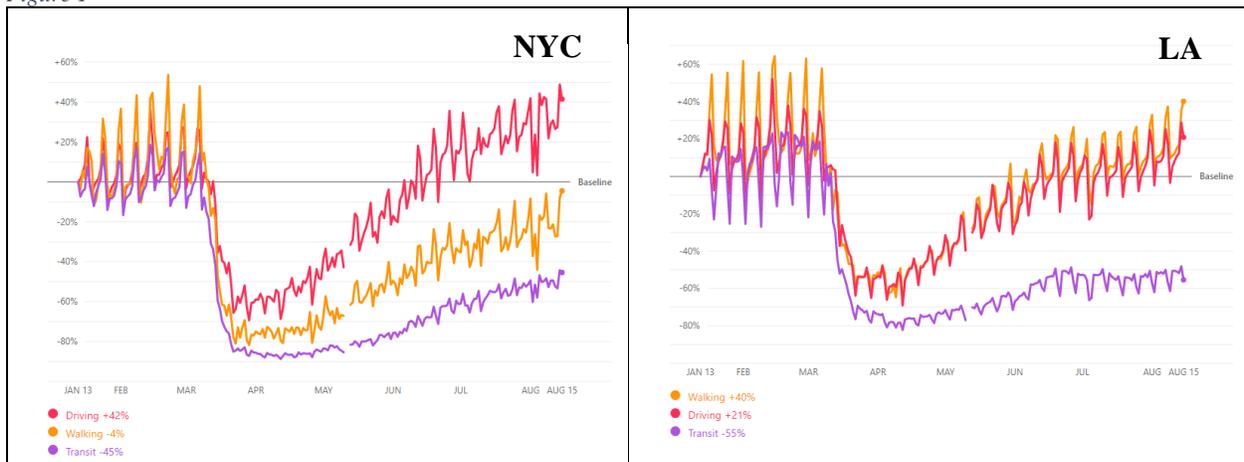
³ *Metro. Taxicab Bd. of Trade v. City of N.Y.*, 615 F.3d 152 (2d Cir. 2010), *cert. denied*, *City of N.Y. v. Metro. Taxicab Bd. of Trade*, 562 U.S. 1264, 131 S. Ct. 1569 (2011).

⁴ https://www1.nyc.gov/assets/tlc/downloads/pdf/2018_tlc_factbook.pdf

The green movement of the early 2000s experienced serious setbacks during the Great Recession, when a different type of “green” (the dollar) became a primary concern for Americans. Nevertheless, other countries around the world before then, and during that timeframe, continued to make strides well ahead of America on alternative fuel vehicle policy. We are now at a turning point in U.S. history, with the results of the Presidential and Congressional elections setting the stage for federal, state, and local sustainability priorities. The anti-car culture movement’s criticisms are partially blunted and resolved by zero-emissions vehicles such as EVs, and manufacturers like Tesla and others are pushing for more infrastructure, longer-lasting battery life, and even more attractive vehicle designs, including convertibles, trucks and sports cars; something that was not possible only a decade ago, as U.S. manufacturers were far behind Honda and Toyota on vehicle battery technology.

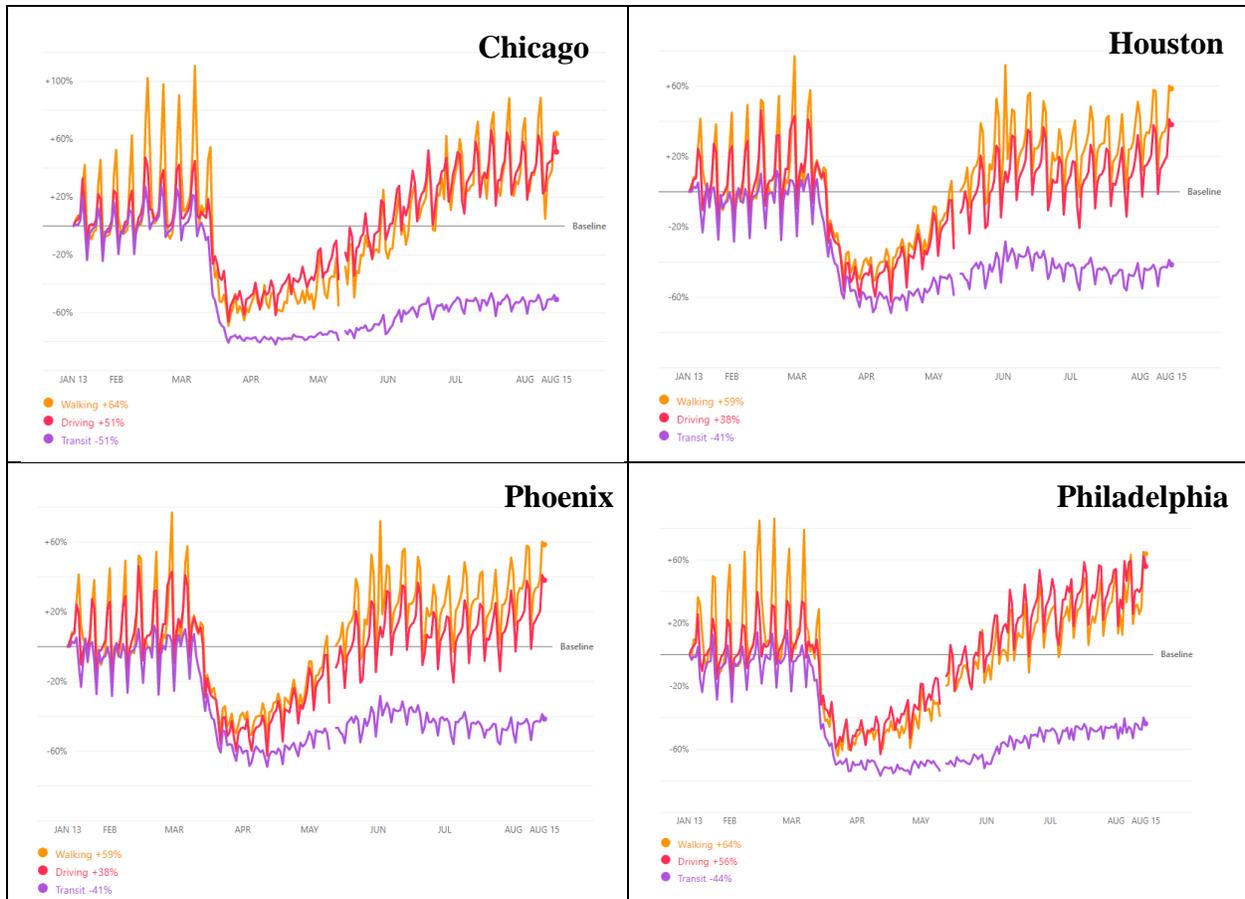
The times have changed, and are continuing to change in the direction of EVs. However, without proper and smart political support by elected officials and sound policy, we may not realize the emissions reducing policies that would help blunt any increased congestion resulting from the COVID-19 pandemic, which has caused people to feel safer taking personal motor vehicles (“PMVs”). Researchers at Vanderbilt University have predicted a sweeping modal shift to single-occupancy vehicle commuting, resulting in the risk of extreme traffic in large metro areas.⁵ The mobility trend report from Apple for several major U.S. cities seems to support this prediction.⁶ As shown in Figure 1, the recovery of public transit is trailing significantly behind driving, which has returned to, and even surpassed, pre-pandemic levels.

Figure 1



⁵ <https://news.vanderbilt.edu/2020/06/05/transportation-lab-predicts-extreme-traffic-for-some-cities-following-covid-19/>

⁶ <https://www.apple.com/covid19/mobility>



Source: Apple Mobility Trends

As cities are gradually emerging from lockdowns, there is a very real risk of a spike in car traffic. If people are going to abandon mass transit in the short or long term, post-pandemic, and use more for-hire vehicles, taxicabs, Transportation Network Company (“TNC”) vehicles, or PMVs, then there is an opportunity now for the government, working with private industry, to make a profound change benefitting the environment and to allow the U.S. to play catch-up, and even exceed EV usage in other countries.

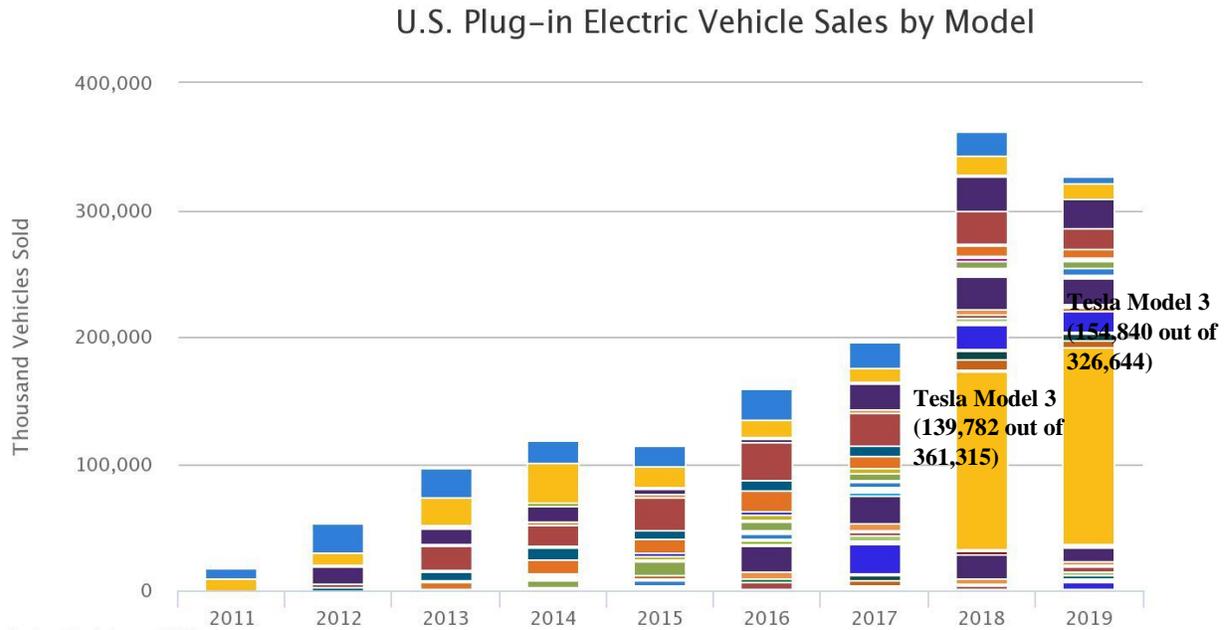
The inspiration for this article was a recent webinar hosted by Companies for Zero Waste, titled “Emerging Technologies Accelerating Circularity.” The program was a two-hour, virtual think tank on the global EV industry (the recording can be accessed [here](#)).⁷ Panelists included OEM representatives, corporate sustainability and supply chain directors, investors, consultants, policymakers, and regulators. I was one of the speakers during the webinar, and shared my thoughts on the regulatory climate with respect to promoting EVs in the U.S., in addition to noteworthy initiatives by federal, state, and local governments. This article expands on that discussion by exploring the various factors that shape the future of EVs. Specifically, the key dimensions of the EV industry that support greater EV adoption include market forces, political support, public policy and regulation, private sector innovation, and public-private partnerships. Several international case studies worth emulating will be covered.

⁷ The password to view the video is QPZ!=f0J

EV Market Outlook

Sales of EVs have been growing steadily over the past ten years in the U.S., but sales reached their zenith in 2018. That year, the total number of EVs sold shot up 81% from 2017.⁸ Plug-in electric vehicles hit a record of 361,315 sales—approximately 17% of global EV sales in 2018.⁹ In 2019, sales started strong the first half of the year but declined beginning in July due to falling fuel prices.¹⁰ As a result, the total number of EVs sold in 2019 was roughly 10% lower compared to 2018. As shown in Figure 2, the Tesla Model 3 alone is responsible for almost 40% of all EV sales in 2018 and 50% in 2019.¹¹ In terms of market share, Tesla, GM, and Nissan absolutely dominate the U.S. market: the top five EV models—Tesla Model 3, Tesla Model S, Chevrolet Volt, Nissan Leaf, and Toyota Prius Prime—account for nearly 60% of all EV sales.¹² That said, EVs account for only 1.3% of all cars sold in the U.S.¹³ The percentage of EVs is much higher in other countries, accounting for 2.6% of global new vehicle sales last year.¹⁴

Figure 2



Source: Transportation Research Center at Argonne National Laboratory

The actual number of EVs on the road, however, paints a more optimistic picture. Despite the drop in the number of EVs sold in 2019, Figure 3 shows that the number of EVs on the road

⁸ https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf

⁹ Id.

¹⁰ <https://www.forbes.com/sites/uhenergy/2019/11/18/whats-happened-to-us-electric-vehicle-sales/#64b8bbf67909>

¹¹ <https://afdc.energy.gov/data/10567>

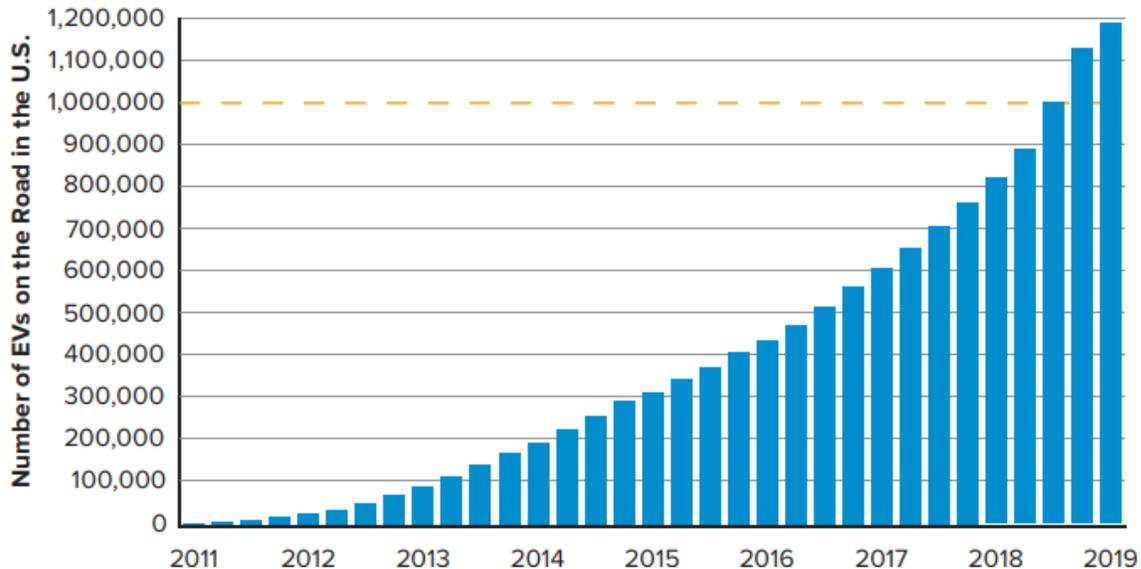
¹² https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf

¹³ <https://www.daytondailynews.com/news/plug-it-in-electric-car-charging-station-numbers-are-rising/NRJFVQNNVRGWHC55BTOUD27XPI/>

¹⁴ <https://www.iea.org/reports/global-ev-outlook-2019>

increased steadily from 2011 to 2019. In fact, by the first quarter of 2019, there were close to 1.2 million EVs on the road in the U.S.¹⁵

Figure 3



Source: Edison Electric Institute

What, then, is the EV market outlook for 2020? Not surprisingly, U.S. car sales fell sharply in the first three months of 2020 due to the COVID-19 pandemic.¹⁶ By April 2020, EV sales were down 55%.¹⁷ The pandemic is undoubtedly set to cause a major downturn in global auto sales in 2020 – and EVs are not exempted. Furthermore, the recovery in EV sales is likely to be slower in the U.S. than in other major regions, as automakers delay the launch of new models and consumers cling to internal combustion engine (“ICE”) vehicles due to low oil prices.¹⁸ The EV market will be bumpy over the next few years. Nonetheless, the long-term trajectory has not changed, with price parity between EVs and ICEs expected by the middle of this decade,¹⁹ primarily due to the falling cost of batteries and automakers’ optimization of their manufacturing processes, with expected increased profitability due to economies of scale.²⁰ Increases in the driving range of EVs and the expansion of charging infrastructure may further boost public acceptance.²¹

Looking forward, the Light-Duty Vehicle (“LDV”) sector may remain the primary segment in the EV market. LDVs are certainly the direction where Tesla and the other automakers have been heading. Batteries still take up around 30% of the cost of an EV, so any major reduction in

¹⁵ https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_EV_Sales_Update_April2019.pdf

¹⁶ <https://www.ft.com/content/bf8d736b-6258-42c9-bbbd-8e63208080f0>

¹⁷ <https://cleantechnica.com/2020/05/29/the-impact-of-covid-19-on-electric-vehicles/>

¹⁸ https://www2.deloitte.com/content/dam/insights/us/articles/22869-electric-vehicles/DI_Electric-Vehicles.pdf

¹⁹ <https://www.forbes.com/sites/mitsubishiheavyindustries/2020/08/13/despite-the-growth-of-evs-theyre-not-a-shortcut-to-clean-transportation/#58ea8e048c16>

²⁰ Id.

²¹ Id.

their cost will have significant impact on the price of the vehicle.²² Beyond passenger cars, delivery vans, two-wheeled vehicles—scooters, mopeds, and motorcycles—along with municipal buses, are heading for electrification at a relatively fast pace, and will accelerate further over the next ten years.²³ There is a growing sense that heavy-duty vehicles and pick-ups are headed for electrification as well.²⁴

Also, there is a growing frame of mind that it is a “given” that the autonomous vehicle (“AV”) movement will include mostly all EVs—working hand-in-hand so much conceptually that the industry and academic terminology speaks of these vehicle technologies together as Connected and Autonomous Electric Vehicles (“CAEVs”). To this point, RethinkX published a report predicting that by 2030, within ten years of regulatory approval of AVs, 95% of U.S. passenger miles traveled will be served by on-demand CAEVs owned by fleets, not individuals, in a new business model known as Transportation-as-a-Service (“TaaS”).²⁵

Factors Affecting EV Adoption

Political Support

Beyond the market forces described in the preceding section, government support will prove crucial in getting EVs up and running. The regulatory outlook of EVs is not so much a question of the pandemic, as it is who sits in the White House on January 20, 2021. If it is the present occupant, then the future for EVs may be much, much slower in coming to fruition. The Trump administration has made clear of its intent to end the federal tax credit (of up to \$7,500) for EVs,²⁶ and research has shown that ending incentives for EVs prematurely can harm their growth.²⁷ The other consequential action by the Trump administration is the rollback of federal fuel efficiency standards earlier this year,²⁸ and this risks creating uncertainties for U.S. automakers and might put them at disadvantage in a global market that is trending towards EVs.²⁹ Over the past few years, nine countries, including the U.K., France, and China, have announced eventual bans on ICEs.³⁰

If former Vice President Joe Biden wins the election, then there may be a higher likelihood of an EV ramp-up. On July 4, 2020, Biden revealed details of a \$2 trillion climate plan, which would create one million jobs in EV manufacturing.³¹ The plan would also create replacement schemes to subsidize U.S. consumers with rebates to swap old, less-efficient vehicles with EVs

²² <https://www.forbes.com/sites/jamesmorris/2020/07/25/can-electric-vehicles-succeed-without-government-support/#30069667370f>

²³ <https://about.bnef.com/electric-vehicle-outlook/>

²⁴ <https://www.nytimes.com/2020/05/07/business/electric-pickup-trucks.html>

²⁵ <https://www.rethinkx.com/transportation>

²⁶ <https://electrek.co/2019/03/11/trumps-budget-kills-federal-tax-credit-for-electric-vehicle-fail/>

²⁷ <https://www.sciencedirect.com/science/article/abs/pii/S1364032117309012>

²⁸ <https://www.cnn.com/2020/03/31/politics/trump-fuel-efficiency-standards/index.html>

²⁹ <https://www.axios.com/lower-fuel-efficiency-standards-threaten-us-energy-dominance-1522463945-d73e2ee8-3c14-43cd-af7e-334f0022ad66.html>

³⁰ <https://qz.com/1341155/nine-countries-say-they-will-ban-internal-combustion-engines-none-have-a-law-to-do-so/>

³¹ <https://www.forbes.com/sites/carltonreid/2020/07/14/car-dependency-baked-into-joe-bidens-2-trillion-climate-plan/#1e5826dff9a1>

built from materials and parts sourced in the U.S.³² Other spending commitments on automobile infrastructure include building half a million EV charging stations.³³ It is interesting to note at this point that unlike other emerging technologies, such as connected and autonomous vehicles, EV proliferation policy is inextricably intertwined with political ideologies. Policies enacted at the highest office in the land, whether in favor of fossil fuel or clean energy, will prove to be either a potent barrier or enabler of EVs. This is because the manufacturing process and a plethora of funding for states is available to assist a comprehensive national plan, although many states and cities have already been committed to EV proliferation through policy incentives. For example, to highlight the potential partisan divide on this issue, Senator Mitch McConnell recently mocked the City of Malibu on the Senate Floor for wanting to use stimulus money to buy a new electric fleet.³⁴

State/City Initiatives

Even in the absence of a consolidated federal mandate towards clean fuel, the adoption of EVs is still possible through the initiatives of public and private sector entities.³⁵ The first problem to tackle is the supply and demand of EVs. Leading the charge on this is, of course, the Golden State of California, which is well known for its ambitious climate and energy goals. To address the supply side of the equation, California has led the nation through its Zero-Emission Vehicle (“ZEV”) mandate, which requires manufacturers to sell a steadily increasing share of EVs each year in order to be allowed to sell ICE vehicles.³⁶ Currently there are twelve states that have adopted the ZEV program: California, Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, Vermont, and Washington.³⁷ Altogether, these states represent nearly 40% of new vehicle sales in the U.S.³⁸ Five more states are about to do the same: Minnesota, New Mexico, Colorado, Ohio, and Nevada.³⁹ To spur the demand of EVs, California has introduced the Clean Vehicle Rebate Program, which offers rebates up to \$7,000 for the purchase or lease of new EVs.⁴⁰ Less generous but still competitive is New York’s Drive Clean Rebate, which provides up to \$2,000 for the purchase or lease of an EV.⁴¹

The second problem to tackle, often described as the “chicken or egg” problem, is the availability of charging infrastructure. This moniker came about due to the conundrum that EVs will not be popular until charging networks are readily available, and charging will not be widely deployed until EVs are popular. There are now 26,000 public charging stations in the U.S., with more than 84,000 plugs,⁴² but will this be enough? To spur more installations, New York State has introduced the Charge Ready program, which offers a rebate of \$4,000 per charging port for

³² Id.

³³ Id.

³⁴ <https://www.foxnews.com/politics/mcconnell-mocks-malibu>

³⁵ <https://www.energy.gov/eere/electricvehicles/electric-vehicles-stakeholder-solution-center>

³⁶ <https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program>

³⁷ <https://dec.vermont.gov/air-quality/mobile-sources/zev>

³⁸ <https://www.reuters.com/article/us-autos-emissions-usa/nevada-to-join-other-states-in-adopting-california-zero-emission-vehicle-rules-idUSKBN23U005>

³⁹ <https://electrek.co/2020/04/13/minnesota-new-mexico-and-other-states-are-poised-to-adopt-california-zev-rules/>

⁴⁰ <https://cleanvehiclerebate.org/eng>

⁴¹ <https://www.nyserda.ny.gov/All%20Programs/Programs/Drive%20Clean%20Rebate>

⁴² <https://wvua23.com/plug-it-in-electric-car-charging-station-numbers-are-rising/#:~:text=There%20are%2026%2C000%20public%20electric,re%20investing%20before%20demand%20arrives.>

standard Level 2 charging stations.⁴³ Stations can be located in public facilities, workplaces, or multi-unit dwellings. In addition, the New York Power Authority has set aside \$250 million to build Level 3 fast-charging stations across the state through 2025.⁴⁴ The initial goal was to install 200 chargers by the end of 2019, but that deadline has been extended by a year.⁴⁵ More recently, Governor Andrew M. Cuomo announced a new “Make-Ready” program that will improve EV economics for developers by covering up to 90% of the costs to make a site ready for EV charging.⁴⁶ Table 1 summarizes some of the key incentives available today.

Table 1

Jurisdiction	Incentives	Details
State (CA)	Clean Vehicle Rebate Program (CVRP)	Up to \$7,000 to purchase or lease a new plug-in hybrid electric vehicle (PHEV) or battery electric vehicle (BEV)
State (NY)	Drive Clean Rebate	Provides up to \$2,000 for the purchase or lease of an EV with a battery capacity of at least 4 kWh
	Clean Pass Program	Allows EVs, PHEVs, and some hybrid vehicles access to HOV lanes on the Long Island Expressway
	Charge Ready NY	Provides a rebate of \$4,000 per charging port for Level 2 charging stations. Stations can be located in public facilities, workplaces, or multi-unit dwellings.
	NYS Income Tax Credit	Available for 50% of the cost of alternative fueling infrastructure, up to \$5,000. Must be for business use and used more than 50% of the time. Unused credits may be carried over into future tax years. The credit expires December 31, 2022.
Port Authority (NY/NJ)	PEV Toll Discount Program	Provides a discounted toll rate for EVs and hybrid vehicles on all Port Authority off-peak hour crossings, after registering with E-Z Pass New York. Applies to the George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Goethals Bridge, Outerbridge Crossing, and Bayonne Bridge.

Source: Alternative Fuels Data Center

⁴³

<https://www.nyserda.ny.gov/All%20Programs/Programs/ChargeNY/Charge%20Electric/Charging%20Station%20Programs/Charge%20Ready%20NY>

⁴⁴ <https://www.bizjournals.com/albany/news/2020/01/17/cuomo-ny-incentives-electric-vehicle-charging.html>

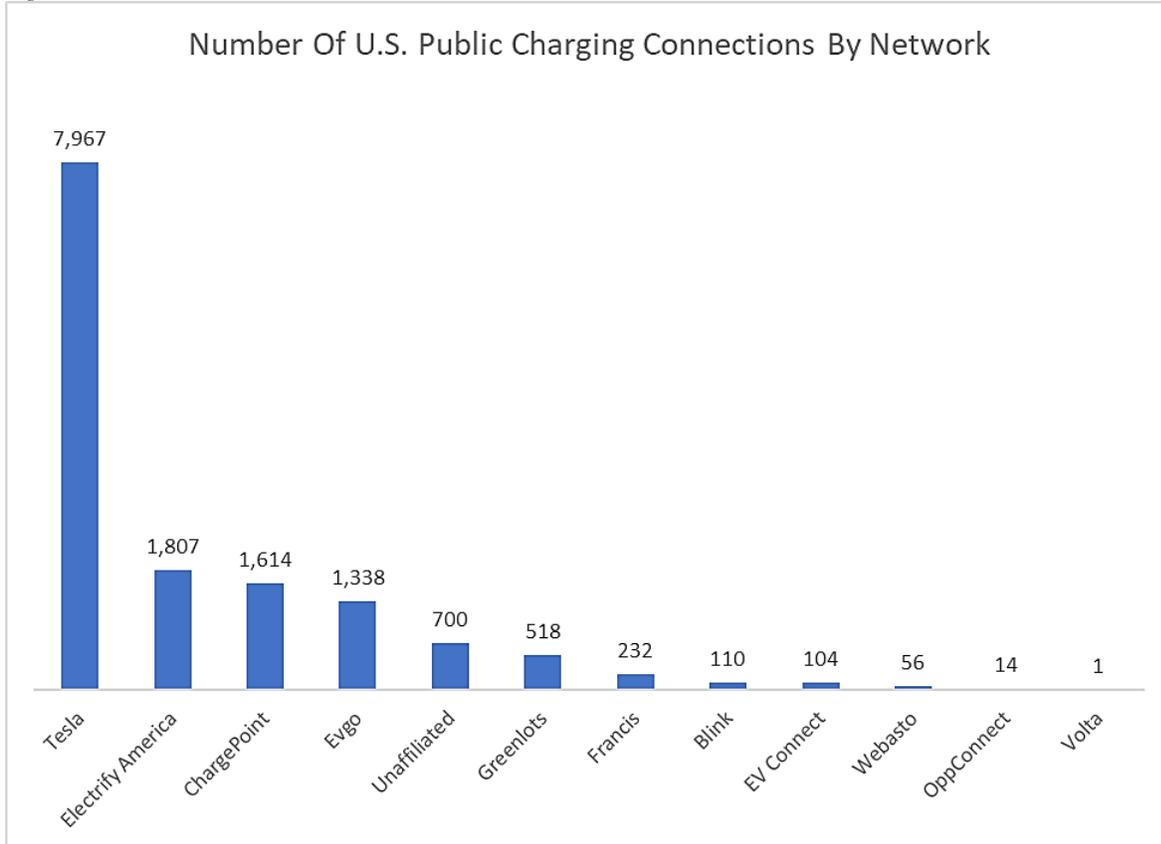
⁴⁵ Id.

⁴⁶ <https://www.governor.ny.gov/news/governor-cuomo-announces-make-ready-program-electric-vehicles>

Private Sector Innovation

The proliferation of charging infrastructure would not be possible without the private sector. In late 2016, Volkswagen created Electrify America with \$2 billion in funding as part of its emissions scam settlement with the U.S. and California.⁴⁷ It has committed to a goal of building hundreds of stations and installing 2,000 chargers by the end of 2020.⁴⁸ Figure 4 shows the number of public charging connections by network provider. Electrify America currently comes in second after Tesla.⁴⁹

Figure 4



Data Source: Alternative Fuels Data Center

Public-Private Partnerships (P3)

One good example of a public-private partnership (“P3”) approach is the EV Shared Mobility project. This project is led by the City of Seattle and Atlas Public Policy, and it brings together the U.S. Department of Energy’s Energy Efficient Mobility Systems program and major industry stakeholders with the cities of Seattle, New York, Portland, and Denver to test different electric, shared mobility interventions. As part of Seattle’s ride-hail outreach efforts, workshops

⁴⁷ <https://www.cnbc.com/2019/05/10/vws-2-billion-penalty-for-diesel-scam-builds-ev-charging-network-across-us.html>

⁴⁸ Id.

⁴⁹ <https://cleantechnica.com/2020/08/06/the-us-fast-charging-landscape-charts/>

on the benefits of EVs and the process of acquiring EVs are being held in collaboration with a driver advocacy group called Drive Forward. Seattle also submitted a proposal to the Department of Energy to re-purpose its funds to conduct a shared mobility electrification needs assessment. This assessment would identify barriers to making all shared mobility options electric by 2030, including for-hire transportation, car share, bike share, and scooter share.⁵⁰

International Case Studies

Europe

Looking beyond the U.S., there are several international cities representing leading paradigms for EV transport. On the top of the list is Oslo, Norway, which, as of July 2020, has the most EVs per capita in the world (approximately 18%).⁵¹ With over 3,000 public charging points per million population, the EV share of sales is around 60%.⁵² How did they get there? Oslo's plentiful incentives include zero-rated purchase tax and no value added tax ("VAT") charged on EVs, free passes on toll roads, access to bus and taxi lanes, free parking on municipal parking spaces, and free travel on ferries that are part of the national highway system.⁵³

Amsterdam, on the other hand, has been handing out freebies, including charging stations, to residents who help rid the city's streets of internal combustion engine (ICE) vehicles. EV owners that do not have their own charging station at home will be able to request the city to install one for free at a location of their choosing, provided it is accessible to the public.⁵⁴ Among the other benefits available to EV owners in Amsterdam include parking permit prioritization.⁵⁵ Starting from July 1, 2020, residents of the Netherlands will be eligible for a €4,000 (\$4,425) subsidy to purchase a new EV and €2,000 (\$2,211) to purchase a second-hand EV.⁵⁶

London has undertaken a novel approach to increase the appeal of EVs. In 2019, the city created the Ultra Low Emission Zone ("ULEZ") in central London, which operates 24/7, year round.⁵⁷ Vans, large trucks, coaches, buses, cars, motorbikes, and all other vehicles that enter the zone must meet the stricter emission standards or pay the daily ULEZ charge.⁵⁸ To avoid paying the charges, one would need to have an EV or at least a Euro 4 petrol-engine car or Euro 6 diesel-engine car.⁵⁹ As shown in Figure 5, the introduction of the zone has caused 22.8% of those surveyed to switch to low-emission vehicles.⁶⁰

⁵⁰ <http://evsharedmobility.org/resource/seattle-project-living-case-study/>

⁵¹ <https://thedriven.io/2020/07/07/oslo-city-hits-new-milestone-most-electric-vehicles-per-capita/>

⁵² https://theicct.org/sites/default/files/publications/EV_city_policies_white_paper_fv_20200224.pdf

⁵³ https://c40-production-images.s3.amazonaws.com/good_practice_briefings/images/7_C40_GPG_LEV_original.pdf?1456788962

⁵⁴ <https://www.cnn.com/2019/05/03/business/amsterdam-electric-cars/index.html>

⁵⁵ <https://www.amsterdam.nl/en/parking/electric-charging/>

⁵⁶ <https://thenextweb.com/plugged/2020/02/03/the-netherlands-will-give-citizens-up-to-4400-for-buying-new-electric-vehicles/>

⁵⁷ <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/ulez-where-and-when>

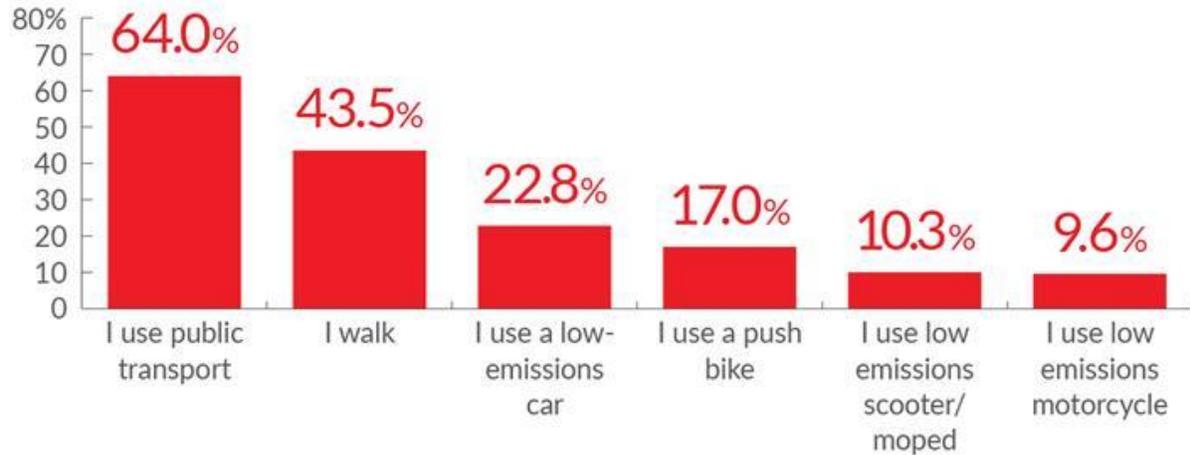
⁵⁸ Id.

⁵⁹ <https://cleantechnica.com/2020/06/24/73-5-of-londoners-changed-usual-mode-of-transport-due-to-ultra-low-emission-zone/>

⁶⁰ Id.

Figure 5

Did you change your usual mode of transport after the ULEZ was introduced?



Source: Bikesure

Asia

Shenzhen, China is another city that has pursued vehicle electrification aggressively. In 2009, the city initiated its New Energy Vehicles Plan, an innovative business model that mobilizes vehicle manufacturers, grid companies, and bus and taxi operators to transition to electric, hybrid, and fuel cell vehicles.⁶¹ By the end of 2017, all public buses in the city were electric.⁶² By January 2019, nearly 95% of the city's more than 21,000 taxicabs were powered by batteries.⁶³ For the uninitiated, Shenzhen hosts the headquarters of BYD, a prominent electric car maker in China backed by Warren Buffett. The city is not alone in its pursuit of electrification of fleets; as there are a dozen other EV pilot cities in China.⁶⁴ China is undoubtedly the largest EV market on the planet today, and is tying subsidies to improving range and power efficiency to foster technological improvements.

In Singapore, the Land Transport Authority ("LTA") has introduced electric taxis, electric buses, and an electric car-sharing program in its quest to contribute to better air quality and improve the environment. In 2017, the LTA launched a trial fleet of 50 electric taxis that has since been issued a full-service operator license and is expected to grow to 800 electric taxis by July 2022.⁶⁵ In 2018, the LTA rolled out 50 pilot hybrid buses to better understand the operational and technical challenges that come with the wider deployment of such buses under the tropical climate and traffic conditions in Singapore.⁶⁶ Lastly, the LTA, together with the Economic Development

⁶¹ https://www.c40.org/case_studies/c40-good-practice-guides-shenzhen-new-energy-vehicles-including-electric-buses#:~:text=Summary,hybrid%20and%20fuel%20cell%20vehicles.

⁶² <https://cleantechnica.com/2017/11/12/100-electric-bus-fleet-shenzhen-pop-11-9-million-end-2017/>

⁶³ <https://www.smartcitiesdive.com/news/electric-taxi-fleet-shenzhen-china/545347/>

⁶⁴ Id.

⁶⁵ https://www.lta.gov.sg/content/ltgov/en/industry_innovations/technologies/electric_vehicles.html

⁶⁶ Id.

Board (“EDB”), created the nationwide electric car-sharing program BlueSG (a subsidiary of the Bolloré Group), with the express goal of deploying 1,000 EVs and building 2,000 charging points by 2020.⁶⁷ As of August 2020, BlueSG has reached its one-millionth rental since its launch in 2017.⁶⁸

Conclusion

EVs are, without a doubt, poised to reach a high degree of mass adoption over the next decade with the onset of technological maturity and substantial commercial applications. Taxicabs, black cars (other for-hire vehicles), and TNCs may be prime candidates for electrification given the fact that TNC trip proliferation often replaces less-polluting transportation modes, such as walking, biking, and mass transit, and has created a congestion crisis in most major U.S. cities. In addition, TNCs accounts for up to 14% of vehicle miles traveled in some cities, and this number is expected to grow rapidly.⁶⁹ There does not appear to be any widespread plans by a private company or government regulator to push incentives or mandates in the for-hire vehicle, taxicab, or TNC arena. As cities move toward congestion pricing, EV fleets should be considered exempt to encourage proliferation.

It is undeniable that EVs would not be experiencing the exponential growth over the last decade without government backing. Unfortunately, EVs have become increasingly controversial—what was once perceived as transitional technology has now taken on distinctly political overtones. The Presidential election is a major inflection point in this process. However, to blunt the expected impact of increased post-pandemic vehicle proliferation, state and local governments will need to make key decisions, with or without federal support or funding, which could very well have a significant impact on EV proliferation. The public-private partnership model is also an effective path for fleet electrification and development of charging infrastructure. All said, the benefits of EVs are undeniable, as they help improve fuel economy, reduce emissions, and increase energy security, so we should not lose sight of this next revolution in transportation. Yet, there must be a multi-tiered policy approach employing as many incentives as possible, as was successfully implemented in many countries, and especially Norway. Federal, state, and local incentives, coupled with pro-EV transportation policies (such as HOV, or high occupancy vehicle lane usage, parking preferences, land use planning for increased EV charging infrastructure, and congestion pricing exemptions), could truly make a difference to chart a course from the U.S.’ current state to Norway!

⁶⁷ Id.

⁶⁸ <https://www.straitstimes.com/singapore/transport/electric-car-sharing-service-reaches-its-one-millionth-rental>

⁶⁹ <https://www.theverge.com/2019/8/6/20756945/uber-lyft-tnc-vmt-traffic-congestion-study-fehr-peers>