

Is range anxiety still a concern for people to buy a EV?

Fandi Sun

Data Source:

- Energy, U. S. D. of. (2022, March 18). Alternative fuel stations in New York: State of New York. Alternative Fuel Stations in New York | State of New York. Retrieved March 20, 2022, from <https://data.ny.gov/Energy-Environment/Alternative-Fuel-Stations-in-New-York/bpkx-gmh7>
- Electric Vehicle Registration Map. Charge NY. (2022, March 1). Retrieved March 20, 2022, from <https://www.nyserda.ny.gov/All-Programs/ChargeNY/Support-Electric/Map-of-EV-Registrations>
- Bureau, U. S. C. (2021, October 8). City and town population totals: 2010-2019. Census.gov. Retrieved March 20, 2022, from <https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-cities-and-towns.html>

All these data set was search from google, but these data were collected by relevant government departments, so the data quality were good and reliability was high

Table of Contents of the Plots:

City and town population totals: 2010-2019:

NAME	STNAME	CENSUS2010POP	ESTIMATESBASE2010	POPESTIMATE2010	POPESTIMATE2011	POPESTIMATE2012	POPESTIMATE2013	POPESTIMATE2014
albany	New York	304204	304199	304085	304627	305776	306661	3072
allegany	New York	48946	48923	48973	48808	48221	47918	476
bronx	New York	1385108	1384224	1386929	1396954	1411087	1421498	14304
broome	New York	200600	200670	200474	199367	198689	197953	1972
cattaraugus	New York	80317	80337	80220	79820	79354	79003	786
cayuga	New York	80026	80022	79905	79707	79524	79112	787
chautauqua	New York	134905	134907	134726	134227	133333	132884	1317
chemung	New York	88830	88846	88895	88916	89162	88230	872
chenango	New York	50477	50516	50404	50196	49898	49489	493
clinton	New York	82128	82131	82099	81735	81730	81544	814
columbia	New York	63096	63063	63035	62532	62450	62153	619
cortland	New York	49336	49287	49277	49382	49028	48913	487
delaware	New York	47980	47962	47888	47584	47217	46806	465
dutchess	New York	297488	297444	297721	298141	297028	296292	2951
erie	New York	919040	919129	919160	919901	919998	921015	9219

Electric Vehicle Registration Map:

	ZIP Code	Registration Valid Date	VIN Prefix	DMV ID	DMV Snapshot	VIN Model Year	Registration Expiration Date	State	Vehicle Name	Technology	county	count
1	12866	2021-05-28	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2023/7/8	NY	Tesla Model 3	BEV	Saratoga County	s
2	11211	2021-05-27	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/8/25	NY	Tesla Model 3	BEV	Kings County	k
3	11733	2021-05-25	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2023/5/24	NY	Tesla Model 3	BEV	Suffolk County	s
4	11701	2021-05-21	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2022/3/31	NY	Tesla Model 3	BEV	Suffolk County	s
5	11230	2021-05-14	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2022/8/16	NY	Tesla Model 3	BEV	Kings County	k
6	11727	2021-05-10	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2023/5/11	NY	Tesla Model 3	BEV	Suffolk County	s
7	10504	2021-05-04	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/5/31	NY	Tesla Model 3	BEV	Westchester County	v
8	11791	2021-04-28	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/1/19	NY	Tesla Model 3	BEV	Nassau County	r
9	14425	2021-04-27	59PMPH1M	53	NY DATA.NY.GOV (6/1/2021)	H	2022/6/30	NY	Workhorse E-GEN Van	PHEV	Ontario County	c
10	11937	2021-04-05	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	L	2022/9/29	NY	Tesla Model 3	BEV	Suffolk County	s
11	10706	2021-03-31	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/3/30	NY	Tesla Model 3	BEV	Westchester County	v
12	14094	2021-03-30	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/3/29	NY	Tesla Model 3	BEV	Niagara County	r
13	13346	2021-03-30	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/2/15	NY	Tesla Model 3	BEV	Madison County	r
14	10583	2021-03-29	5YJ3E1EB	53	NY DATA.NY.GOV (6/1/2021)	M	2023/4/20	NY	Tesla Model 3	BEV	Westchester County	v

Alternative fuel stations in New York: State of New York:

	Fuel Type Code	Station Name	Street Address	Intersection Directions	City	State	ZIP	Plus4	Station Phone	Status
1	ELEC	Walgreens - Broo...	589 Prospect Av...	\$2.00 first hour, ...	Brooklyn	NY	11215	NA	800-663-5633	E
2	ELEC	BNL Northeast of...	Renaissance Cir	1005S	Upton	NY	11961	NA	NA	E
3	ELEC	BNL Eastside of B...	Renaissance Cir	1008E	Upton	NY	11961	NA	NA	E
4	ELEC	Western New Yor...	2182 Alvin Rd	Accessible from I...	Grand Island	NY	14072	NA	518-436-2831	E
5	ELEC	Fairport Village L...	100 Fairport Vill...	Adjacent to parki...	Fairport	NY	14450	NA	585-223-9500	E
6	ELEC	Skaneateles Villa...	26 Fennell St	At Village Hall bu...	Skaneateles	NY	13152	NA	315-685-3440 ...	E
7	ELEC	iPark - Enterpris...	315 E 40th Street	Attendant will as...	New York	NY	10016	NA	888-998-2546	E
8	ELEC	iPark - Paradise ...	62-60 99th Street	Attendant will as...	Rego Park	NY	11374	NA	888-998-2546	E
9	ELEC	iPark - 59 Allen ...	59 Allen Street	Attendant will as...	New York	NY	10002	NA	888-998-2546	E
10	ELEC	NYC Parking 200	1081 3rd Avenue	Attendant will as...	New York	NY	10065	NA	888-998-2546	E
11	ELEC	165 E 77 ST Gara...	165 E 77th Street	Attendant will as...	Manhattan	NY	10075	NA	888-998-2546	E
12	ELEC	Imperial Parking	332-342 E 34th St	Attendant will as...	New York	NY	10016	NA	888-998-2546	E
13	ELEC	NYC Parking Kent	444 Kent Avenue	Attendant will as...	Brooklyn	NY	11211	NA	888-998-2546	E
14	ELEC	Village of Monto...	300 W Main St	Behind Main Stre...	Montour Falls	NY	14865	NA	607-535-7367 ...	E

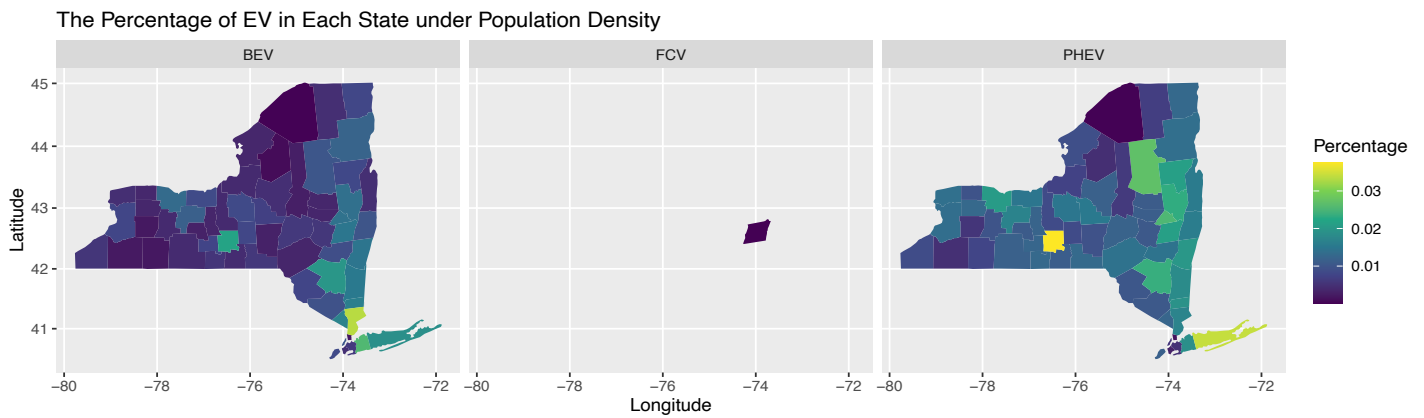
Why does this subject appeal to me?

EV is the abbreviated form of electric vehicle. In these recent year, electric car become more and more popular because of its tremendous benefit such as no need to pay for gas, and more intelligent than traditional cars. However, EV contain an unsolvable problem put us off buying it, which is whether the car would break down on road due to there is no charge station. That is what we called range anxiety.

Nowadays, there are three types of EV in market – BEV, FCV, and PHEV. BEV is only use electric as energy to power cars. FCV is use hydrogen. PHEV also use electric as energy, but when the electric in battery runs out, this kind of car would continue using fuel to move.

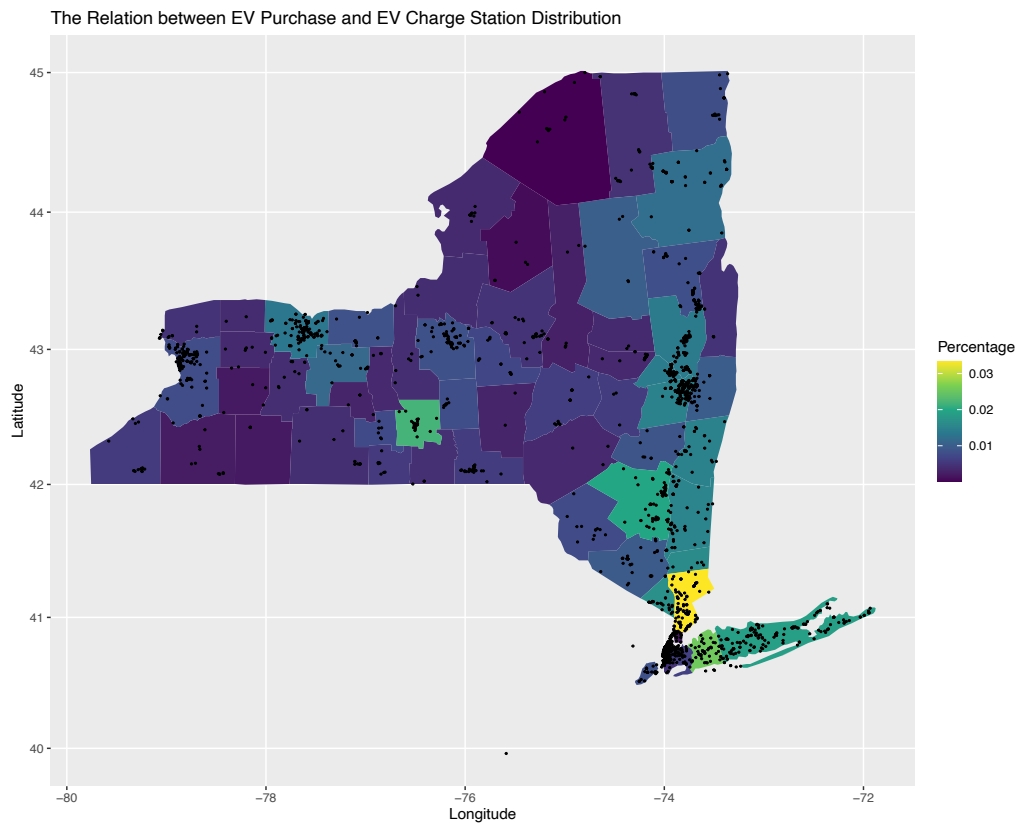
How many people buy Electric Vehicle in each State?

The first chart, we would separately calculate the rate of these three types of EV that how many percent of each county citizen already own an electric car. So that we could know which county's people prefer to buy electric car.



Are few charging station limit people to buy electric cars?

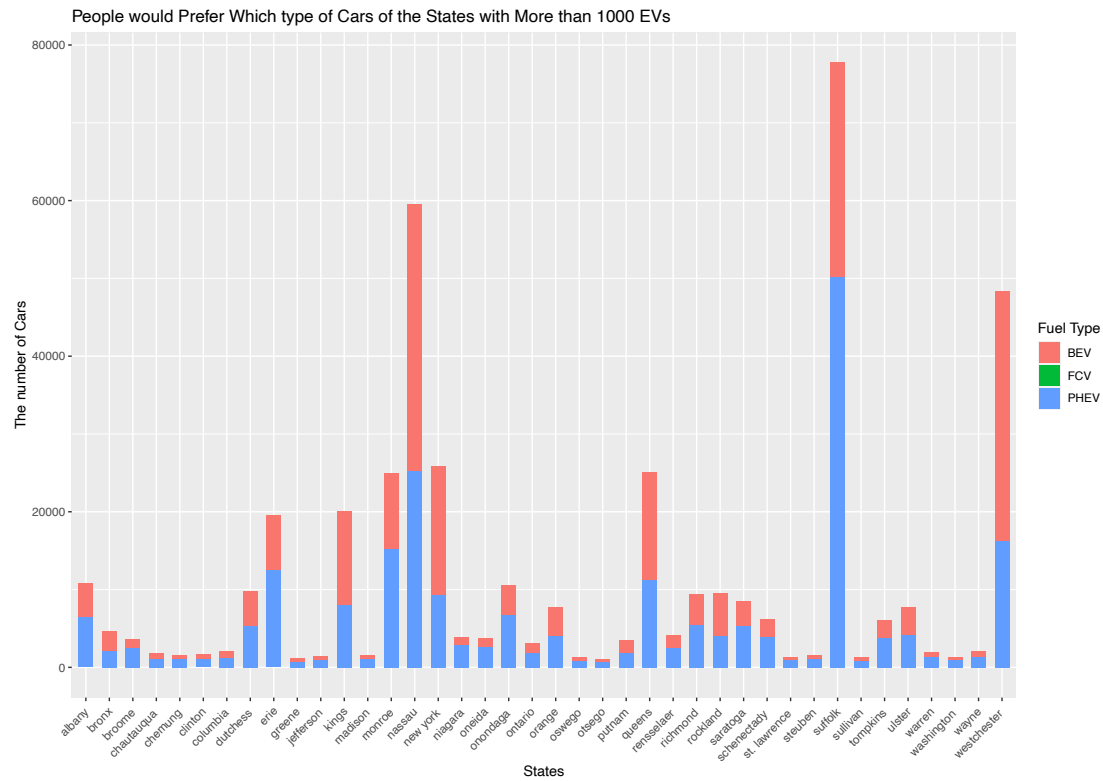
Through viewing the first chart, we know the county around New York city and NYC are most like to buy EV, and the northern part of New York State citizen don't wonder to buy an EV. Then, next, let's see whether they don't prefer EV is due to there is only a few charges station. Thus, the second chart be created.



From this chart, I find the northeastern part of New York State, which with a few EV cars county, only have scattered and a few charging stations. For there EV drivers, almost the only place to charge their car is at their home. So, for these people, EV would not be a good choice for them because as long as they need have a long journey, electric cars even couldn't get there.

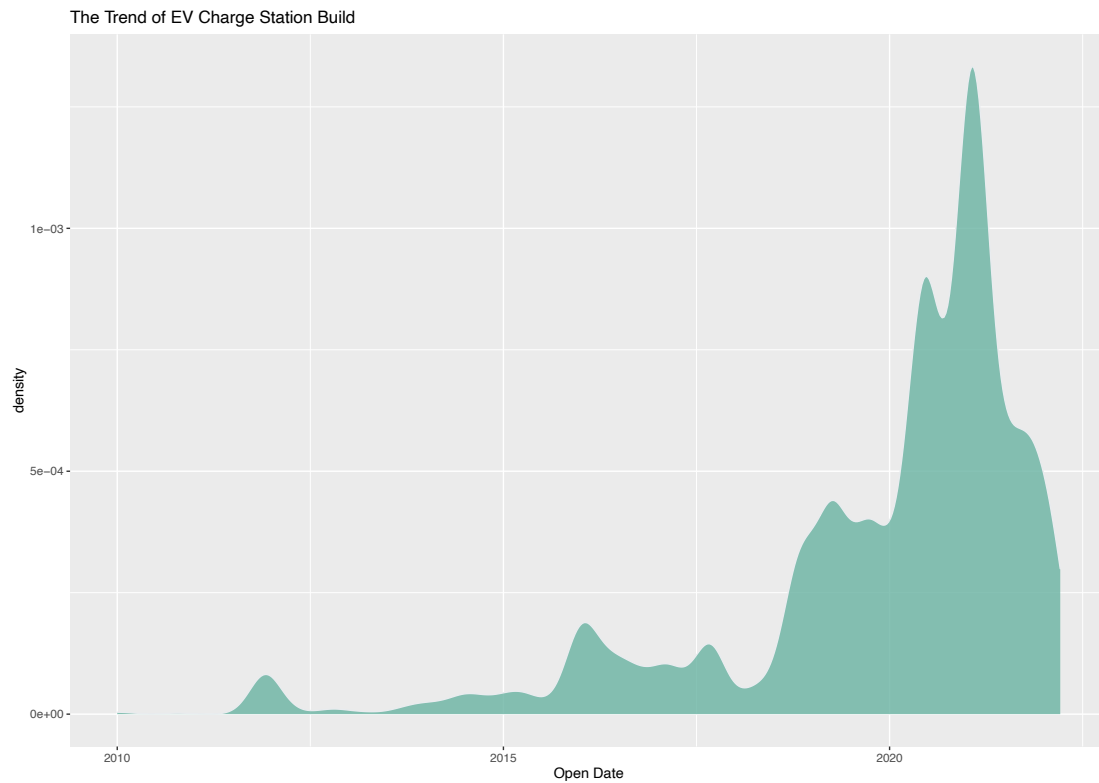
Would people more like to buy BEV cars in states with large number of charge Station?

Then back to check whether people also have range anxiety in the counties with large number of charge stations. We could through compare the number of BEV cars and PHEV cars to judge yes or no. Through the third chart, we got that people still like to buy PHEV cars mostly because PHEV car could still use its second energy type to continually move.



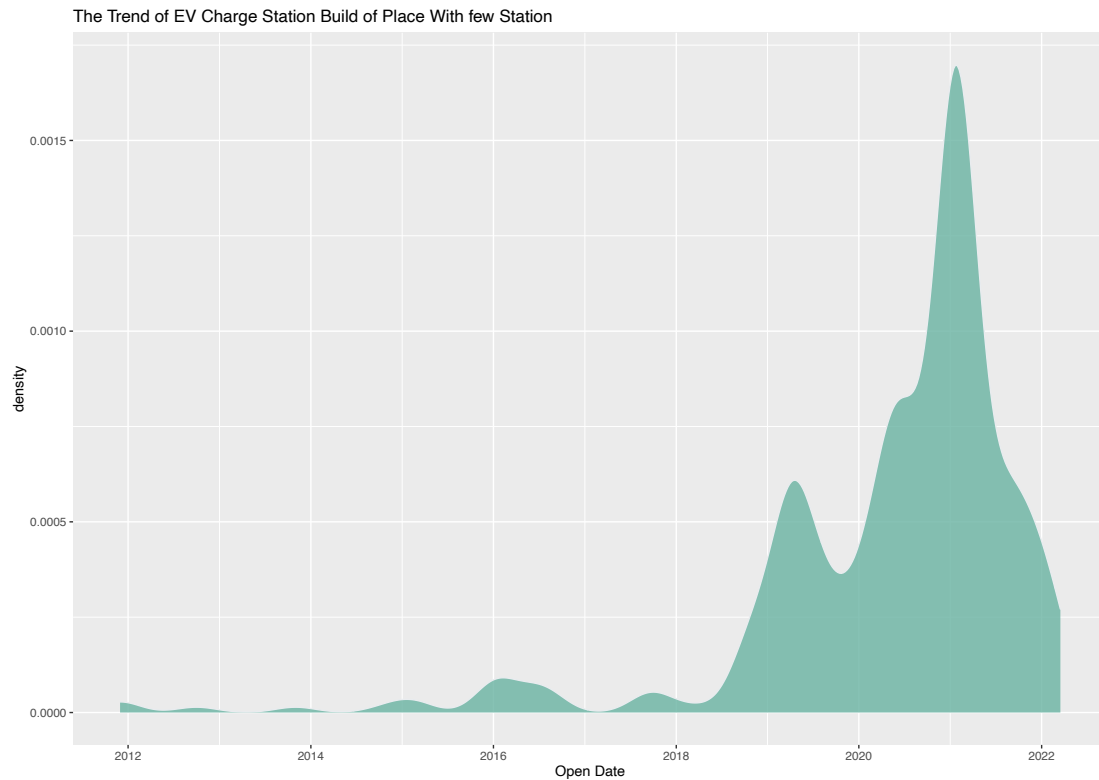
The construction of charging stations is accelerating year by year

The only way to relieve the range anxiety is to build more charge station. From the fourth chart, which based on these three-year charge station build data to build; we realize that the speed to build is constantly increase.



The trend of people buying electric cars will increase year by year in the future

Even we could know from the last diagram, in the county that contain low number of charge station, the new build speed is also increase.



Conclusion:

The reasons that people don't want to buy electric car have lots of and various, but through this research, the range anxiety definitely is one of them. Thus, when can we confidently to buy an EV is what we need to research in the future. Because I don't have the range information of every brand and model of cars, so I could calculate how far should have a charging station.