

EV Power - Lab 4 Project Report

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Research Question: Does EV adoption align with cleaner electricity supply across states, and how has that alignment changed from 2021–2023?

In this report, what we are hoping to see is whether the adoption of EV cars would align with cleaner electricity supplies across the states, but not only that, to see whether this has changed across the years or not.

In this section, we have assembled a state and year dataset that includes each state’s total energy use, renewable energy use, and the resulting renewable share (renewable use divided by their total use). We’ve also created a 2023 table that joins this information to each state’s EV registrations, and a summary table showing the change in renewable share from 2021 to 2023 to highlight where grids are getting cleaner or whether they are going down.

state	year	renew_use	total_use	price	renewable_share
Alabama	2021	239816	2352656	NA	0.1019342
Alaska	2021	9598	684975	NA	0.0140122
Arizona	2021	99266	1681257	NA	0.0590427
Arkansas	2021	89714	1136025	NA	0.0789719
California	2021	810020	6142252	NA	0.1318767
Colorado	2021	103956	1364155	NA	0.0762054
Connecticut	2021	49306	821709	NA	0.0600042
Delaware	2021	7151	208041	NA	0.0343730

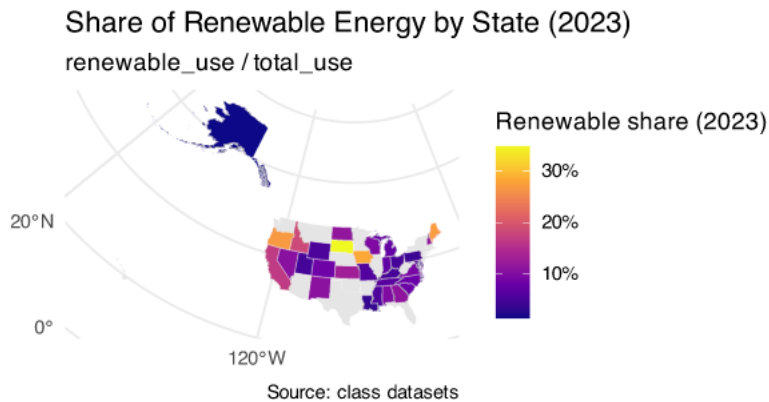
state	renew_use	total_use	renewable_share	price	ev_count
Alabama	222189	2265008	0.0980963	NA	13047
Alaska	10088	746979	0.0135051	NA	2697
California	1065179	6429818	0.1656624	NA	1256646
Colorado	115062	1359507	0.0846351	NA	90083
Delaware	8040	203487	0.0395111	NA	8435
District of Columbia	2796	46323	0.0603588	NA	8066
Georgia	291462	2627553	0.1109253	NA	92368

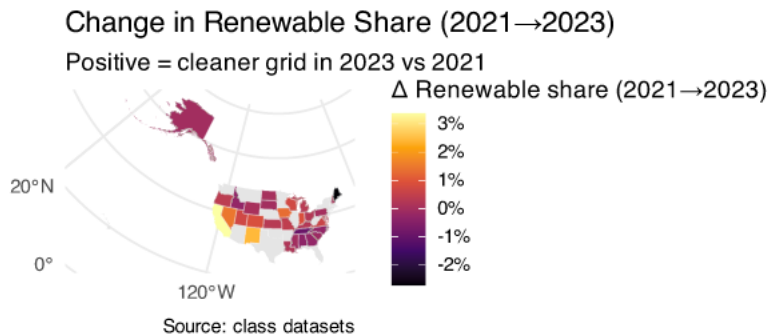
state	renew_use	total_use	renewable_share	price	ev_count
Idaho	77127	421975	0.1827762	NA	8501

state	2021	2023	delta_21_23
California	0.1318767	0.1656624	0.0337857
New Mexico	0.0835994	0.1078673	0.0242679
Nevada	0.0920663	0.1066695	0.0146032
Iowa	0.2695588	0.2827689	0.0132101
District of Columbia	0.0504852	0.0603588	0.0098736
Indiana	0.0631159	0.0719196	0.0088037
Colorado	0.0762054	0.0846351	0.0084297
Wisconsin	0.0894680	0.0966130	0.0071449

In the following maps, we can see two main maps. The first of which is renewable share of energy by state in 2023, the most recent data, and see which states are focusing more on renewable energy versus those which are not.

The second map shows the change in renewable share, which is to say, which states have been improving, as change in how much of a renewable share they have.





Taking into account these results, we are able to see that there are states like South Dakota, Oregon, Iowa, and Maine, which currently (2023) have a lot of their energy come from renewable sources, whereas states like Alaska, Utah, Wyoming, and many across the East Coast do not. However, this is not to say that this is due to a lack of increasing their renewable shares, as indeed, from the second graph, we are able to see that many of these states that have low renewable shares are indeed trying to improve, with some increasing their share of renewable energy over time. However, some states we would have assumed to be very clean, such as Maine, actually drop in how much renewable energy they produce, which is a very interesting find. It shows that a high use of renewable energy does not suggest a trend in increasing renewable energies.

Going back to the original question, there are many factors that do tend to show that a high ev count does align with cleaner electricity, especially with states like California, which has a massive ev count, using more renewable energy. But renewable energy has changed quite a bit across states, but overall across the US, states generally try to lean more towards renewable energies.