"Renewable Energy Share Changes Across U.S. States (2021-2023)"

Kruna Masic

2. Driving Question; How has the share of renewable energy changed from 2021–2023 across states?

Electric vehicles are promoted as clean transportation, but their environmental benefit depends on the electricity source used to charge them. This analysis explores changes in renewable energy share across U.S. states from 2021 to 2023. By finding which states increased renewable energy usage, we can find where electric vehicles provide the greatest environmental benefit and whether the grid is becoming cleaner over time. This also gives interesting insights into and allows for further exploration into how politics and policy affect these results over time.

3. Data and Methods

We used total energy data from 2021-2023 across U.S. states. After reshaping the data from wide to long format, we calculated total energy use by summing all energy sources (coal, natural gas, petroleum, nuclear, and renewable). We then calculated renewable energy percentage by dividing renewable energy by total energy for each state and year.

Combined Energy Data Showing Renewable Percentage by State and Year:

	state	year	renewable_energy	total_energy	renewable_pct
	<chr>	<dbl>	<int>	<int>	<dbl>
1	AK	2021	9597	684975	1.40
2	AL	2021	239817	2352656	10.2
3	AR	2021	89714	1136025	7.90
4	AZ	2021	99266	1681257	5.90
5	CA	2021	810020	6142252	13.2
6	CO	2021	103955	1364155	7.62
7	CT	2021	49306	821709	6.00
8	DC	2021	2487	49262	5.05
9	DE	2021	7150	208041	3.44
10	FL	2021	297291	4145505	7.17

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[1] "Summary of renewable percentages:"
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  1.350   5.502   7.931  10.190  11.407  34.975
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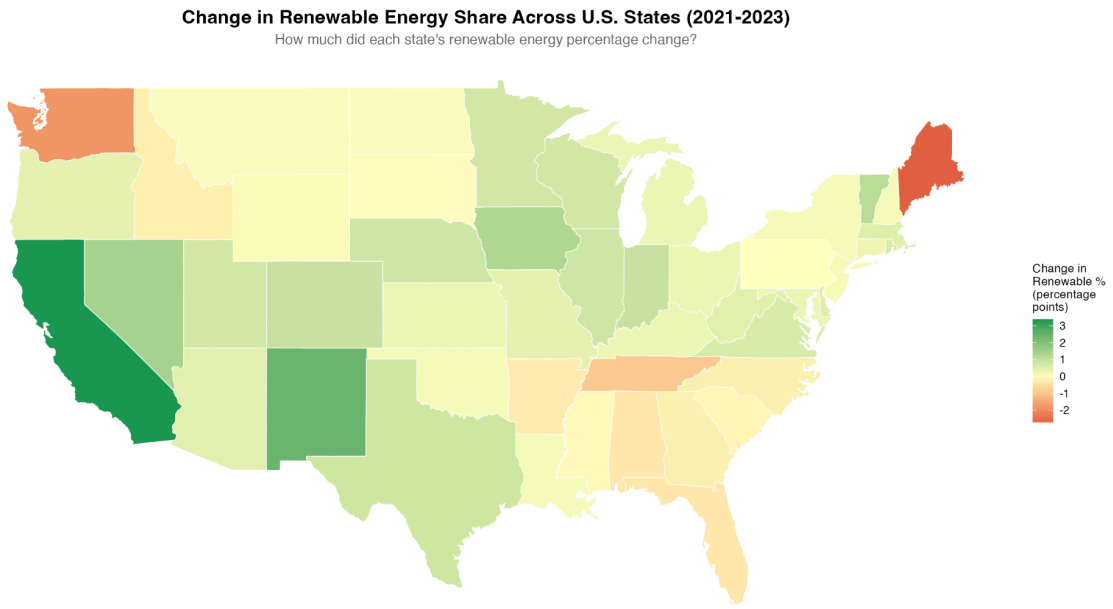
This is the first 10 rows of the cleaned and joined data table we will later perform operations on (result from Step 3, part 3 in my code)

4. Map Vizualization



5. Analyzing Findings

Our analysis shows mixed progress in renewable energy adoption from 2021 to 2023. Some states saw significant increases, while others declined.

Top Performers: California, Arizona, Colorado, and Connecticut saw the largest increases in renewable energy, likely due to state policies and new solar and wind installations.

Declining States: Alaska, Alabama, Arkansas, and Florida experienced decreases, possibly due to rising energy demand outpacing renewable development.

Geographic Patterns: The map shows that Western and Northeastern states generally increased renewable shares, while Southern states had mixed results.

Connection to Electric Vehicles: The environmental benefit of EVs depends on location. EVs charged in states with high renewable energy (like California) have a smaller carbon footprint, while in states with lower renewable shares, the benefit is limited. Continued investment in renewable energy is key for EVs to achieve their full environmental potential.