EV Power - Lab 4 Project Report

Part 0: libraries

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    Package LibPath Version Priority Depends Imports LinkingTo Suggests
    Enhances License License_is_FOSS License_restricts_use OS_type Archs
    MD5sum NeedsCompilation Built

── Attaching core tidyverse packages ──────────────────── tidyverse 2.0.0 ──
✓ dplyr     1.1.4     ✓ readr     2.1.5
✓ forcats   1.0.1     ✓ stringr   1.5.2
✓ ggplot2   4.0.0     ✓ tibble    3.3.0
✓ lubridate 1.9.4     ✓ tidyr     1.3.1
✓ purrr     1.1.0
── Conflicts ──────────────────────────────────── tidyverse_conflicts() ──
✗ dplyr::filter() masks stats::filter()
✗ dplyr::lag()    masks stats::lag()
ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

Part 1: Defining Research Question

Chosen Question: Does investing in renewable engery lead to the a lowering of energy costs?

Part 2: Data Preparation and Cleaning

Part 3: Joining / Pivoting Datasets for Analysis

Since my question is concerned with the effects of investing in Renewable Energy, I will limit my plots to the experiemental group (States with the most growth in renewable energy: CO, AR, CA, and TX) and the Control (States with the least amount of growth in renewable energy: FL, AL, TN, WA)

Data and Methods

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Show [10 ▾] entries   Search: [   ]

	State	total_2021	total_2022	total_2023	Difference_21_22	Difference_22_23	Difference_21_23
1	CO	103956	114918	5556615	10962	5441697	5452659
2	AR	89714	90824	894469	1110	803645	804755
3	CA	810020	880995	1065179	70975	184184	255159
4	TX	654199	751680	791210	97481	39530	137011
5	WA	394052	418470	365955	24418	-52515	-28097
6	TN	135841	116473	115679	-19368	-794	-20162
7	AL	239816	232035	222189	-7781	-9846	-17627

	State	total_2021	total_2022	total_2023	Difference_21_22	Difference_22_23	Difference_21_23
8	FL	297290	304605	286307	7315	-18298	-10983

Interactive Energy Table

Showing 1 to 8 of 8 entries   Previous [1] Next

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Show [10 ▾] entries   Search: [   ]

	State	type	year	values
1	CO	total	2021	103956
2	CO	total	2022	114918
3	CO	total	2023	5556615
4	CO			10962
5	CO			5441697
6	CO			5452659
7	AR	total	2021	89714
8	AR	total	2022	90824
9	AR	total	2023	894469
10	AR			1110

Interactive Long Energy Table

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	State	2021	2022	2023
1	CO	20.64	25.85	23.85
2	AR	18.42	23.84	21.76
3	CA	28.44	37.35	35.72
4	TX	16.38	20.78	17.37
5	FL	22.53	29.35	28.12
6	AL	17.85	23.37	21.11
7	TN	19.57	25.76	23.31

State		2021	2022	2023
8	WA	20.95	26.93	26.35

Interactive Average Energy Price Table

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	State	year	values
1	CO	2021	20.64
2	CO	2022	25.85
3	CO	2023	23.85
4	AR	2021	18.42
5	AR	2022	23.84
6	AR	2023	21.76
7	CA	2021	28.44
8	CA	2022	37.35
9	CA	2023	35.72
10	TX	2021	16.38

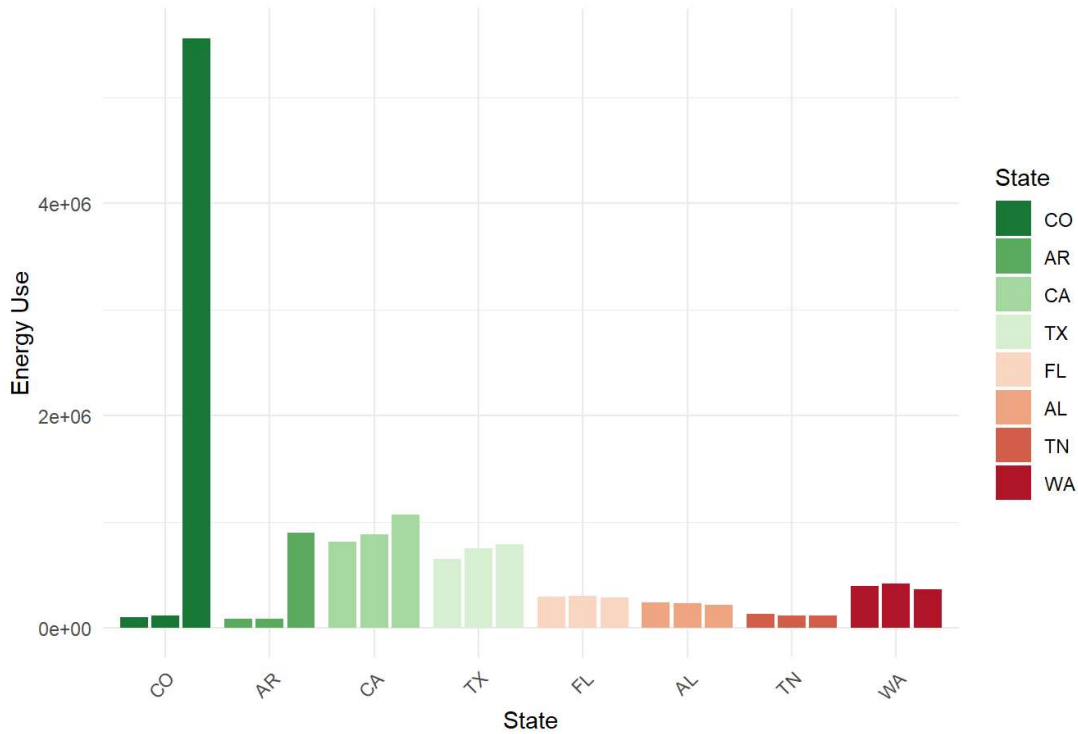Interactive Long Average Energy Price Table

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Part 4: Mapping Visualization

Energy Use by State and Year

This bar plot shows the the top 4 states that invested in renewable energy use, and the bottom four states that didn't invest in renewable energy over a three year period. The bars show the states total renewable energy use, allowing the viewer to see if the states had growth or decline in energy use.

Average Price of Energy Change from 2021 to 2023
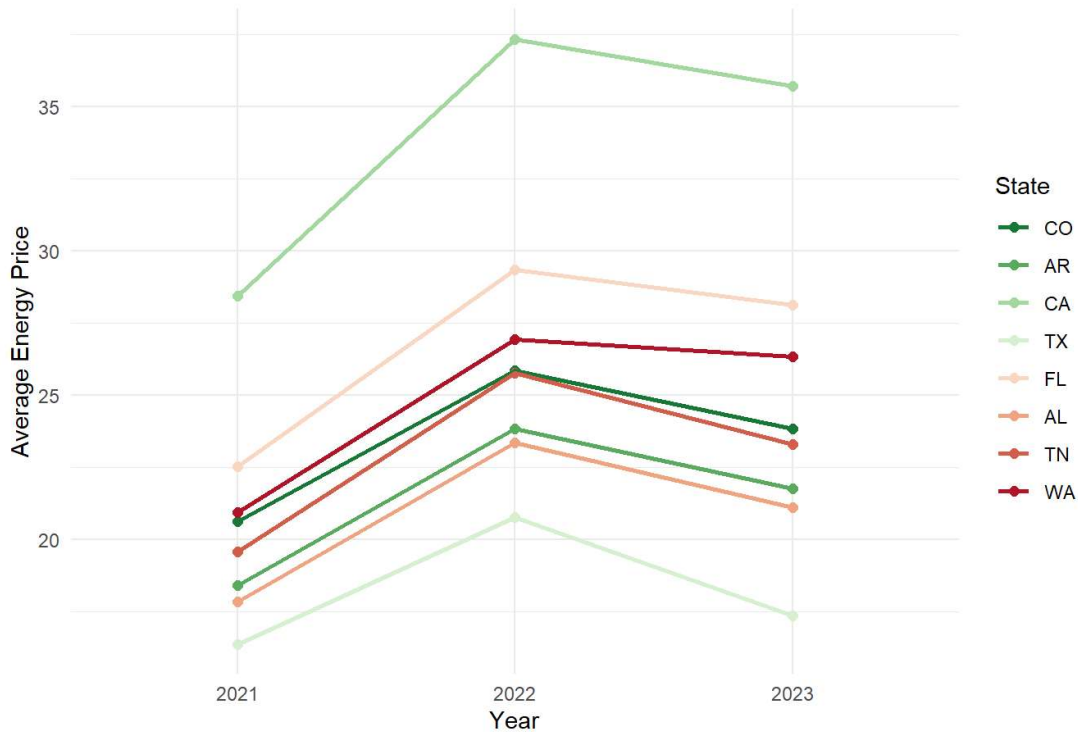
This plot shows the average energy price aver the years. Despite the half the states investing in renewable energy, and the other half not investing, there doesn't appear to be a clear affect on the price of energy.

Therefore it is inconclusise weither investing in renewable energy leads to a lowering in energy costs.

Future questions that can be asked include breaking the question down to specific renewable energy sources (Biomass, Geothermal, Hydro, Solar, and Wind) to see if specific types of energy have more of an effect on cost.

Another question would be to increade the time span beyond three years to see if there is more of a patter.

Additionally, there is an odd increase in energy cost in 2022. With additional data sources, it would be interesting to understand what lead to this increase across the country.