

# Proportions of Renewable Energy Usage in the US - Lab 4 Project Report

## Example Solution 1

### Part 0: libraries

### Part 1: Defining Research Question

Given the datasets containing the renewable energy uses per state, both compared to total energy usage and subtotals of types of renewable energy, I decided to compare the proportions of renewable energy used by each state in 2023, to see which ones are most/least used in each state.

Chosen Question: What is the most prominent renewable energy source used by each state in 2023?

### Part 2: Data Preparation and Cleaning

```
# A tibble: 5 x 53
  Energy_Source      AK      AL      AR      AZ      CA      CO      CT      DC      DE
  <chr>             <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1 coal_usage       18414 224926 180262 137885 2.87e4 204826      0      0     338
2 NaturalGas      448087 775747 399566 537151 2.15e6 525446 304924 26236 84387
3 petroleum       270391 565754 327465 599712 3.00e6 514174 292864 17292 110721
4 nuclear-energy †      0 476392 156492 329474 1.85e5      0 142873      0      0
5 total renewable~ 10087 222189 87277 108445 1.07e6 115061 48981 2795 8041
# i 43 more variables: FL <dbl>, GA <dbl>, HI <dbl>, IA <dbl>, ID <dbl>,
#   IL <dbl>, IN <dbl>, KS <dbl>, KY <dbl>, LA <dbl>, MA <dbl>, MD <dbl>,
#   ME <dbl>, MI <dbl>, MN <dbl>, MO <dbl>, MS <dbl>, MT <dbl>, NC <dbl>,
#   ND <dbl>, NE <dbl>, NH <dbl>, NJ <dbl>, NM <dbl>, NV <dbl>, NY <dbl>,
#   OH <dbl>, OK <dbl>, OR <dbl>, PA <dbl>, RI <dbl>, SC <dbl>, SD <dbl>,
```

```
# TN <dbl>, TX <dbl>, UT <dbl>, VA <dbl>, VT <dbl>, WA <dbl>, WI <dbl>,
# WV <dbl>, WY <dbl>, US <dbl>
```

### Part 3: Joining / Pivoting Datasets for Analysis

```
# A tibble: 6 x 2
  State prop_renewable
  <chr>         <dbl>
1 AK           0.0135
2 AL           0.0981
3 AR           0.0758
4 AZ           0.0633
5 CA           0.166
6 CO           0.0846
```

```
# A tibble: 6 x 2
  State prop_biomass
  <chr>         <dbl>
1 AK           0.00456
2 AL           0.0835
3 AR           0.0620
4 AZ           0.0214
5 CA           0.0953
6 CO           0.0261
```

```
# A tibble: 6 x 2
  State prop_geothermal
  <chr>         <dbl>
1 AK           0.000249
2 AL           0.0000623
3 AR           0.702
4 AZ           0.000201
5 CA           0.00631
6 CO           0.000558
```

```
# A tibble: 6 x 2
  State prop_hydropower
  <chr>         <dbl>
1 AK           0.00810
2 AL           0.0127
3 AR           0.00957
```

```

4 AZ          0.0118
5 CA          0.0172
6 CO          4.01

```

```

# A tibble: 6 x 2
  State prop_solar
  <chr>      <dbl>
1 AK      0.0000897
2 AL      0.00187
3 AR      0.00360
4 AZ      0.0265
5 CA      0.0395
6 CO      0.0136

```

```

# A tibble: 6 x 2
  State prop_wind
  <chr>      <dbl>
1 AK      0.000509
2 AL      0
3 AR      0
4 AZ      0.00345
5 CA      0.00744
6 CO      0.0404

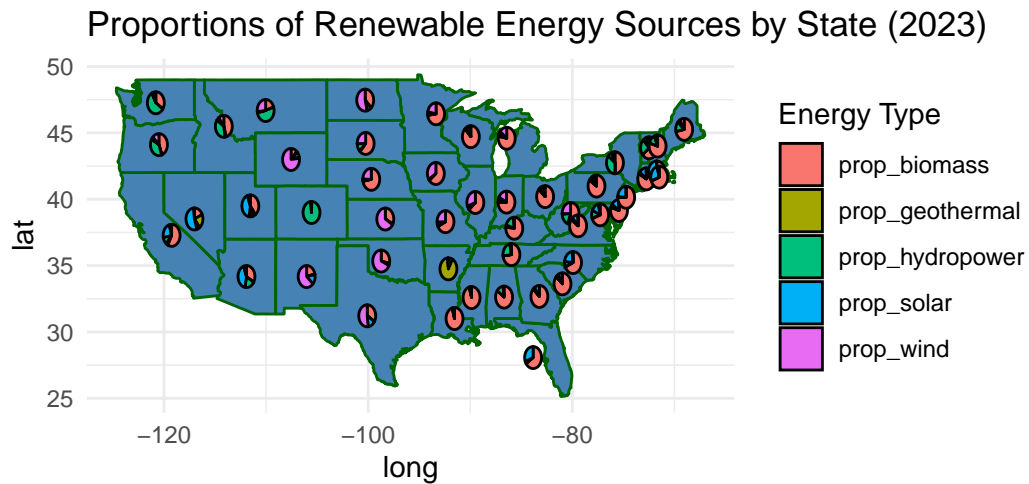
```

```

# A tibble: 6 x 7
  State prop_renewable prop_biomass prop_geothermal prop_hydropower prop_solar
  <chr>      <dbl>      <dbl>      <dbl>      <dbl>      <dbl>
1 AK      0.0135      0.00456      0.000249      0.00810  0.0000897
2 AL      0.0981      0.0835      0.0000623      0.0127  0.00187
3 AR      0.0758      0.0620      0.702         0.00957  0.00360
4 AZ      0.0633      0.0214      0.000201      0.0118  0.0265
5 CA      0.166       0.0953      0.00631      0.0172  0.0395
6 CO      0.0846      0.0261      0.000558      4.01    0.0136
# i 1 more variable: prop_wind <dbl>

```

## Part 4: Mapping Visualization



After looking at the visualization, I can see that a large amount of states located in the eastern part of the US use biomass renewable energy as their majority energy source. Wind power is prominent within midwestern states, and some states have more random majorities, like Arkansas being predominantly geothermal, and Colorado predominantly hydropower.