EV Power - Lab 4 Project Report

Example Solution 1

Part 0: libraries

```
#install.packages("sf")
library(sf)
```

```
Linking to GEOS 3.13.0, GDAL 3.8.5, PROJ 9.5.1; sf_use_s2() is TRUE
```

```
#install.packages("rnaturalearth")
library(rnaturalearth)
library(dplyr)
```

```
Attaching package: 'dplyr'
```

```
The following objects are masked from 'package:stats':

    filter, lag
```

```
The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(stringr)
```

Part 1: Defining Research Question

Chosen Question: Are EV registrations concentrated in states with cleaner energy mixes? Brainstorming: - I will probably want to get ratios of renewable energy use out of total energy use per state. - Can then look at # of EV registration by state, see if it correlates to the ratio of renewable/ total energy - I could make a correlation plot and fit a regression. Can also make two maps, coloring one map with ratio of renewable/total and other map with # EV registrations. –> see how similar these two maps look.

Part 2: Data Preparation and Cleaning

data I'll need: ev-registrations-by-state-2023.csv renew-use-2023.csv - actually maybe don't need since total-use includes it. total-use-2023.csv

```r
renew_use_2023 <- read.csv("/Users/dmitrieva/Desktop/STAT133_fall2025/project4/
ev-power-AnnaDmitrieva7/data/renew-use-2023.csv")
head(renew_use_2023)
```

```
  State Energy_Source Renewable_Use_2023
1   AK        Biomass           3404 kWh
2   AK     Geothermal              186.0
3   AK      Hydropower               6051
4   AK   Solar Energy                 67
5   AK    Wind Energy                380
6   AL        Biomass         189040 kWh
```

```r
total_use_2023 <- read.csv("/Users/dmitrieva/Desktop/STAT133_fall2025/project4/
ev-power-AnnaDmitrieva7/data/total-use-2023.csv")

ev_registrations_2023 <- read.csv("/Users/dmitrieva/Desktop/STAT133_fall2025/
project4/ev-power-AnnaDmitrieva7/data/ev-registrations-by-state-2023.csv")

ev_registrations_2023 <- rename(ev_registrations_2023, State =
electric.vehicle.registrations_by_state..2023.) #Renaming first column
ev_registrations_2023 <- rename(ev_registrations_2023, Ev_registrations = X)
#Renaming second column
ev_registrations_2023 <- ev_registrations_2023[-c(1,2), ] #Removing blank first
row
ev_registrations_2023$State <- state.abb[match(ev_registrations_2023$State,
state.name)] #Converting state names to abbreviations to match total use file
ev_registrations_2023 <- ev_registrations_2023 |>
  mutate(Ev_registrations = str_remove_all(Ev_registrations, "[#~]"),
         Ev_registrations = str_extract(Ev_registrations, "\\d+"),
         Ev_registrations = as.numeric(Ev_registrations))

head(ev_registrations_2023) #Looks good!
```

```
  State Ev_registrations
3   AL            13047
4   AK             2697
5   AZ            89798
6   AR             7108
7   CA          1256646
8   CO            90083
```

```
    State Ev_registrations
3     AL            13047
4     AK             2697
5     AZ            89798
6     AR             7108
7     CA          1256646
8     CO            90083
9     CT            31557
10    DE             8435
11  <NA>             8066
12    FL           254878
13    GA            92368
14    HI            25565
15    ID             8501
16    IL            99573
17    IN            26101
18    IA             9031
19    KS            11271
20    KY            11617
21    LA             8150
22    ME             7377
23    MD            72139
24    MA            73768
25    MI            50284
26    MN            37050
27    MS             3590
28    MO            26861
29    MT             4608
30    NE             6920
31    NV            47361
32    NH             9861
33    NJ           134753
34    NM            10276
35    NY           131250
36    NC            70164
37    ND              959
38    OH            50393
39    OK            22843
40    OR            64361
41    PA            70154
42    RI             6396
43    SC            20873
44    SD             1675
45    TN            33221
46    TX           230125
```

```
47    UT          39998
48    VT           7816
49    VA          84936
50    WA         152101
51    WV           2758
52    WI          24943
53    WY           1139
54  <NA>        3555445
```

Part 3: Joining / Pivoting Datasets for Analysis

```
#I'll need to pivot total_use_2023 file
#I want to first use pivot_longer to get states into one column and then
pivot_wider to ensure I have one row per state.
```

Part 4: Mapping Visualization

```
#I'm sorry I didn't get to this part :((
```