Final Project

David Robinson, Aditi Jackson, and Jonathan Joyner

December 6th, 2023

Contents

Rationale and Research Questions **5**

Dataset Information **6**

Wrangling eGRID **6**

Exploratory Analysis **9**

Analysis **10**

Geospatial Analysis **11**

Question 1: <insert specific question here and add additional subsections for additional questions below, if needed> 11

Question 2: 11

Summary and Conclusions **12**

References **13**

List of Tables

List of Figures

Rationale and Research Questions

To conduct a preliminary exploration of the ways in which the political systems and the electricity grid coexist, our team has formulated the following research questions:

1) What is the relationship between the percent penetration of renewable technology (i.e., solar, wind) and state governor (using the political affiliation of the state governor as a proxy for a state's political leanings) in a given year / over a period of time?

2) Has renewable penetration grown in any states that have had a single-party governor over a longer period of time?

Dataset Information

Wrangling eGRID

```
# selecting data for desired columns from imported eGRID datasets

#Note column "PLPFGNCT" for 2010 -- note that "PLFUELCT" was dropped and replaced
eGRID2010_sub <- eGRID2010 %>%
  mutate(YEAR="2010") %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLPFGNCT,NAMEPCAP,LAT,LON)

eGRID2010_sub$PLFUELCT <- eGRID2010_sub$PLPFGNCT
eGRID2010_sub$PLPFGNCT <- NULL

#Note column "PLPFGNCT" for 2012 -- note that "PLFUELCT" was dropped and replaced
eGRID2012_sub <- eGRID2012 %>%
  mutate(YEAR="2012") %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLPFGNCT,NAMEPCAP,LAT,LON)

eGRID2012_sub$PLFUELCT <- eGRID2012_sub$PLPFGNCT
eGRID2012_sub$PLPFGNCT <- NULL

eGRID2014_sub <- eGRID2014 %>%
  mutate(YEAR="2014") %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLFUELCT,NAMEPCAP,LAT,LON)

eGRID2016_sub <- eGRID2016 %>%
  mutate(YEAR="2016") %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLFUELCT,NAMEPCAP,LAT,LON)

eGRID2018_sub <- eGRID2018 %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLFUELCT,NAMEPCAP,LAT,LON)

eGRID2020_sub <- eGRID2020 %>%
  select(YEAR,PSTATABB,ORISPL,PNAME,PLFUELCT,NAMEPCAP,LAT,LON)

# merging eGRID data, filtering for renewable fuels
eGRID_2010_2020 <- rbind(eGRID2010_sub,eGRID2012_sub,eGRID2014_sub,eGRID2016_sub,
      eGRID2018_sub,eGRID2020_sub)

# checking fuel types
unique(eGRID_2010_2020$PLFUELCT)
```

```
##  [1] "OIL"        "GAS"        "HYDRO"      "COAL"       NA
##  [6] "WIND"       "OTHRFOSL"   "BIOMASS"    "NUCLEAR"    "SOLAR"
## [11] "GEOTHERMAL" "WSTHTOTPUR" "OTHF"       "OFSL"
```

```
# filtering for desired fuel types
eGRID_2010_2020_RENEW <- filter(eGRID_2010_2020,PLFUELCT=="SOLAR"|PLFUELCT=="WIND"|PLFUELCT=="GEOTHERMA
          PLFUELCT=="HYDRO"|PLFUELCT=="BIOMASS"|PLFUELCT=="NUCLEAR")
```

```r
#Change year column to character
eGRID_2010_2020_RENEW$YEAR <- as.character(eGRID_2010_2020_RENEW$YEAR)

# checking fuel types were filtered correctly
unique(eGRID_2010_2020_RENEW$PLFUELCT)
```

```
## [1] "HYDRO"      "WIND"       "BIOMASS"    "NUCLEAR"    "SOLAR"
## [6] "GEOTHERMAL"
```

```r
# checking to ensure all years of interest are present
unique(eGRID_2010_2020_RENEW$YEAR)
```

```
## [1] "2010" "2012" "2014" "2016" "2018" "2020"
```

```r
# saving process data as CSV
write_excel_csv(eGRID_2010_2020_RENEW,
                path = "Data/Processed/eGRID_2010_2020_RENEW.csv")
```

```
## Warning: The ‘path‘ argument of ‘write_excel_csv()‘ is deprecated as of readr 1.4.0.
## i Please use the ‘file‘ argument instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```

#Wrangling Gov Data

Exploratory Analysis

Analysis

Geospatial Analysis

```
#Playing around with data cuts

GOV_States.sf.NC <- GOV_States.sf %>%
  filter(StateAbbreviation == "NC")


#mapview(GOV_States.sf.NC, zcol = "party", col.regions = party_colors_NC)

#mapview(GOV_States.sf.NC, subset = GOV_States.sf.NC$year == "2013", zcol = "party", col.regions = party

#mapview(GOV_States.sf.NC, subset = GOV_States.sf.NC$year == "2010", zcol = "party", col.regions = party

#Note that "GOV_States.sf.NC$End_Year" is a character
#mapview(GOV_States.sf.NC, subset = GOV_States.sf.NC$End_Year == "2013", zcol = "party", col.regions = p
 #mapview(Gov_eGRID.sf, subset = Gov_eGRID.sf$PSTATABB == "NC", subset = #Gov_eGRID.sf$PLFUELCT == "SOL




#party_colors_NC <- c("Democrat" = "blue",
 #                    "Republican" = "red")

#GOV_States.sf.NC$party <- as.factor(GOV_States.sf.NC$party)
#GOV_States.sf.NC$End_Year <- as.numeric(GOV_States.sf.NC$End_Year)


#party_colors_NC <- mapviewColors(x=GOV_States.sf.NC,
                                  #zcol="party",
                                  #colors = c("red", "blue"),
                                 #at = unique(GOV_States.sf.NC$party))


#mapview(filter(GOV_States.sf.NC,End_Year == "2013"), zcol = "party", col.regions = party_colors_NC)

#mapview(GOV_States.sf.NC, subset = GOV_States.sf.NC$End_Year == "2016", zcol = "party", col.regions = p
```

Question 1: <insert specific question here and add additional subsections for additional questions below, if needed>

Question 2:

Summary and Conclusions

References

<add references here if relevant, otherwise delete this section>