Lab 2

Sofia Garrick 04/16/20

Data

energy data source: Independent Statistics & Analysis: U.S. Energy Information Administration link

shape file source: US Census link

```
## Linking to GEOS 3.5.1, GDAL 2.2.2, PROJ 4.9.2
```

```
##
## 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
```

Load Data

```
data = read.csv("/cloud/project/test.csv", stringsAsFactors = FALSE)

data_en = data %>%
  mutate(consumptionnum = as.numeric(consumption))

shape = st_read("/cloud/project/us_boundaries_updated.shp")
```

```
## Reading layer `us_boundaries_updated' from data source `/cloud/project/us_boundaries_updated.shp' us
## Simple feature collection with 50 features and 14 fields
## geometry type:  MULTIPOLYGON
## dimension:      XY
## bbox:           xmin: -179.2311 ymin: 18.86546 xmax: 179.8597 ymax: 71.43979
## CRS:            4269
```

```
shape_new = shape %>%
  rename(STATE=STUSPS)
```

CLEANING THE DATA

generate clean csv

```
totconsumption = data_en %>%
  group_by(YEAR, STATE) %>%
  summarize(tot = sum(consumptionnum))

setwd("/cloud/project/")
write.csv(x = totconsumption, file = "energy_usage1.csv")
```

connect spatial data

```
energy = read.csv("/cloud/project/energy_usage.csv")
energy_shp = left_join(shape_new, energy)
```

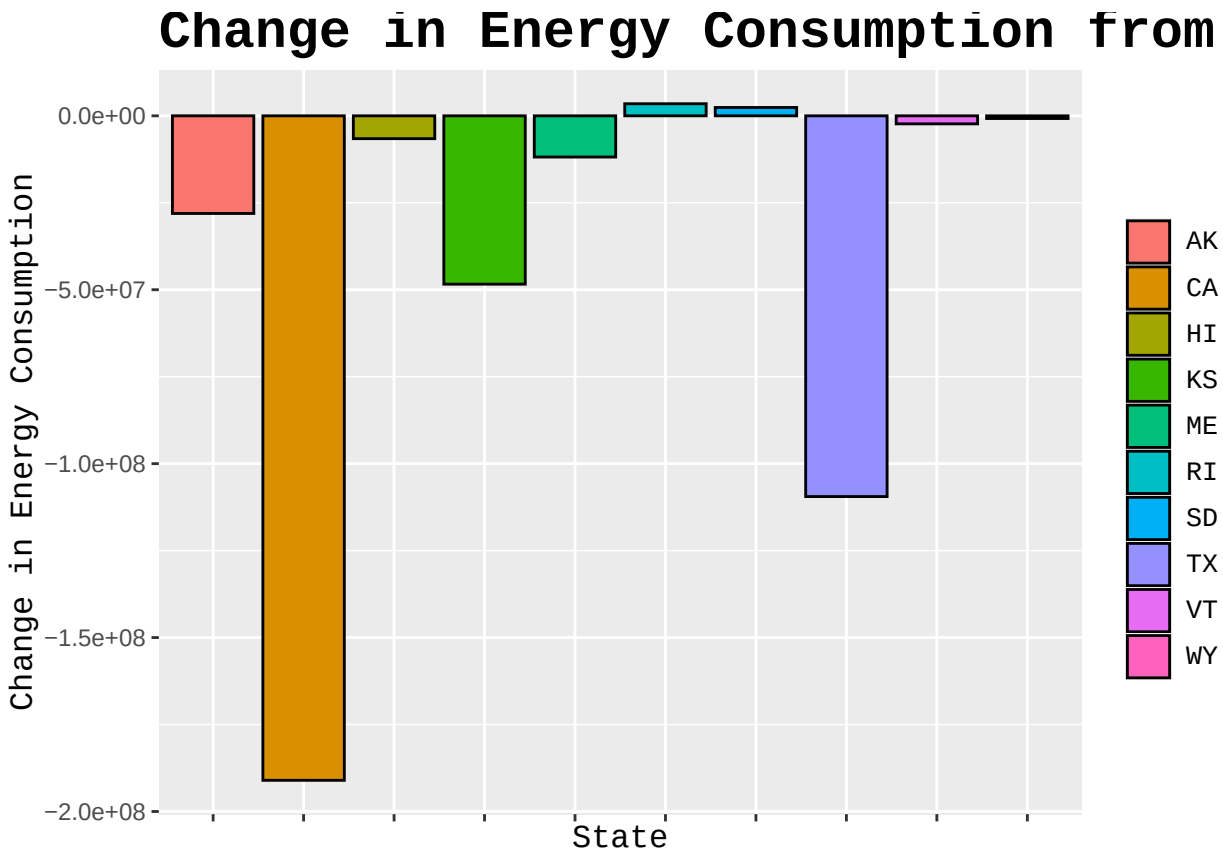
```
## Joining, by = "STATE"
```

EXPLORING THE DATA: summary stats

What is the change in energy consumption from 2000 to 2015?

```
changed = energy_shp %>%
  mutate(change = tot_2015-tot_2000) %>%
  top_n(n=-10, wt = change)

ggplot(changed, aes(x=STATE, y=change, fill=STATE))+
geom_bar(stat="identity", color="black")+ ggtitle("Change in Energy Consumption from 2000 to 2015") + la
```

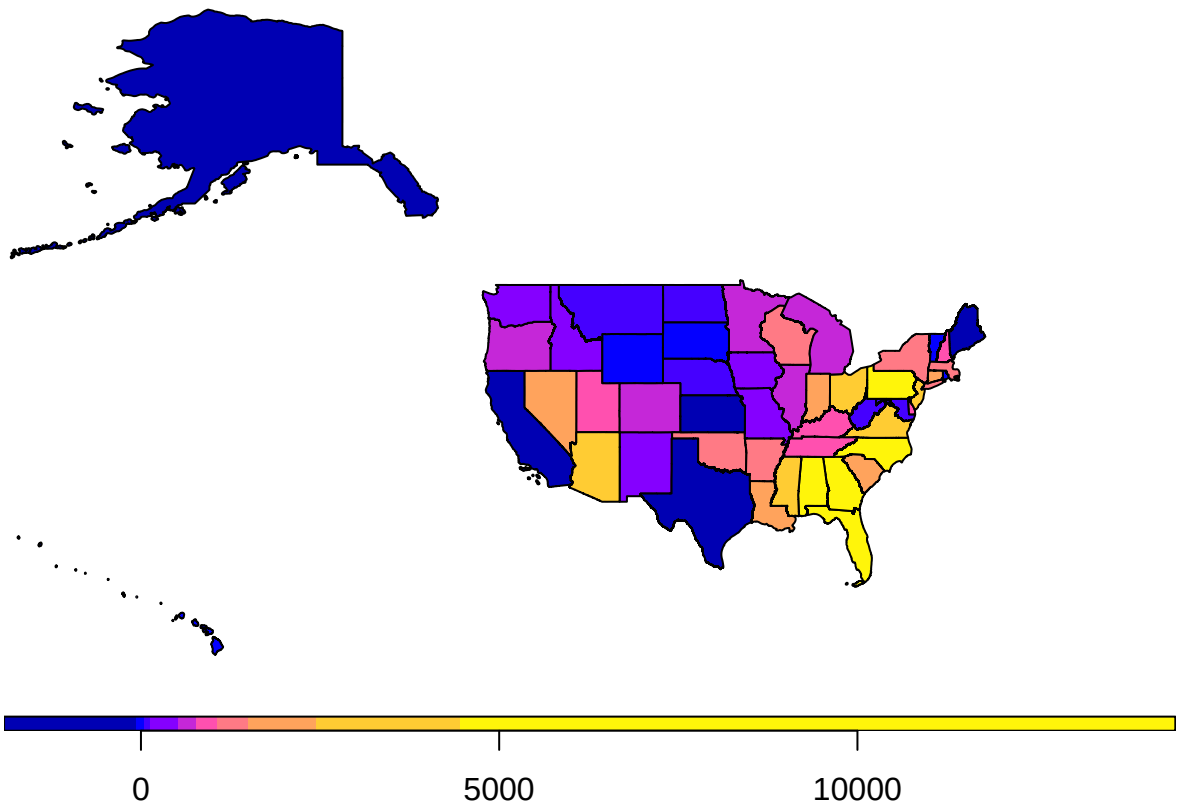


MAPPING THE DATA

map of change in energy consumption from year 2000 to year 2015

```
allchange = energy_shp %>%
  mutate(change = tot_2015-tot_2000,
         changep = (tot_2015-tot_2000) * 1/100000)

plot(allchange["changep"],xlim= c(-175, -50) ,ylim=c(20, 70), main = "Change in Energy Consumption", ce
```


Change in Energy Consumption
0
5000
10000