# SEDS - Example

Datasets

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## Introduction

```
rm(list = ls())
pklist <- c("tidyverse")
source("https://fgeerolf.github.io/datasets/load-packages.R")
options(tibble.print_max = 100)
```

## Loading SEDS

SEDS is available here: https://www.eia.gov/state/seds/seds-data-complete.php
EIA: Energy Information Administration

```
load("seds.complete.RData")
load("seds.series.RData")
```

## Example - Oil

### Some detail

Source: https://www.eia.gov/state/seds/seds-data-complete.php

- **All (Consolidated data file)**: https://www.eia.gov/state/seds/CDF/Complete_SEDS.csv

Apparently there are different types of oil:
- Crude oil - Asphalt and road oil - Distillate fuel oil
- Residual fuel oil

### Inputing data

Crude oil is the only type of oil that is produced (also coal, renewable energy, natural gas):

```
seds.series %>%
  filter(grepl("production", variable.desc1) &
           grepl("oil", variable.desc1)) %>%
```

```
  arrange(variable.desc1) %>%
  as.tibble
```

```
## # A tibble: 3 x 3
##   variable variable.desc1                                    variable.desc2
##   <chr>    <chr>                                             <chr>
## 1 PAPRB    Crude oil production (including lease conde~ Billion Btu
## 2 PAPRP    Crude oil production (including lease conde~ Barrels
## 3 COPRK    Factor for converting crude oil production ~ Million Btu per b~
```

```
seds.complete %>%
  filter(year == 1960 &
           state.code == "CA" &
           variable == "ARICP") %>%
  select(value)
```

```
##      value
## 1 10665000
```

About the uses of fuel oil (difference between residual fuel oil, distillate fuel oil): https://en.wikipedia.org/wiki/Fuel_oil#Uses

On residual fuel oil: "Residual fuel oil is less useful because it is so viscous that it has to be heated with a special heating system before use and it may contain relatively high amounts of pollutants, particularly sulfur, which forms sulfur dioxide upon combustion. However, its undesirable properties make it very cheap. In fact, it is the cheapest liquid fuel available. Since it requires heating before use, residual fuel oil cannot be used in road vehicles, boats or small ships, as the heating equipment takes up valuable space and makes the vehicle heavier. Heating the oil is also a delicate procedure, which is impractical on small, fast moving vehicles. **However, power plants and large ships are able to use residual fuel oil.**"

We get everything in **thousands of barrels**, and we are going to compute the number of barrels per person which is being:
- consumed by cars (transportation sector) – using DFACP (transportation sector) - - produced: PAPRP - used as an input in the industrial sector: DFICP + ARICP - distillate fuel oil/ asphalt and road oil

Note: The **42-gallon** oil barrel was officially adopted in 1866. Cost of crude oil is approximately: **1.21 USD**.

How about Kerosene consumption by state: - P1TCP **or** P1TXP (consumption or end-use consumption)

```
seds.series %>%
  filter(grepl("Crude oil", variable.desc1) &
           variable.desc2 == "Barrels") %>%
  select(-variable.desc2) %>%
  left_join(seds.complete %>%
              filter(year == 2006 & state.code == "CA" |
                       year == 2006 & state.code == "TX") %>%
              mutate(variable2 = paste0(state.code, year)) %>%
              select(variable, variable2, value) %>%
              spread(variable2, value),
            by = "variable") %>%
  arrange(variable.desc1) %>%
  as.tibble
```

```
# A tibble: 2 x 4
  variable variable.desc1                                    CA2006   TX2006
  <chr>    <chr>                                              <dbl>    <dbl>
1 COICP    Crude oil consumed by the industrial sector.           0   0.
2 PAPRP    Crude oil production (including lease conde~ 223015000   3.92e8
```

```
seds.series %>%
  filter(grepl("Motor gasoline", variable.desc1) &
           variable.desc2 == "Barrels") %>%
  select(-variable.desc2) %>%
  left_join(seds.complete %>%
              filter(year == 2006 & state.code == "CA" |
                       year == 2006 & state.code == "TX") %>%
              mutate(variable2 = paste0(state.code, year)) %>%
              select(variable, variable2, value) %>%
              spread(variable2, value),
            by = "variable") %>%
  arrange(variable.desc1) %>%
  as.tibble
```

```
# A tibble: 6 x 4
  variable variable.desc1                                    CA2006  TX2006
  <chr>    <chr>                                              <dbl>   <dbl>
1 MBICP    Motor gasoline blending components consumed b~   0.      0.
2 MGCCP    Motor gasoline consumed by the commercial sec~   2.85e5  1.87e5
3 MGICP    Motor gasoline consumed by the industrial sec~   5.50e6  6.10e6
4 MGACP    Motor gasoline consumed by the transportation~   3.77e8  2.79e8
5 MGTCP    Motor gasoline total consumption.                3.83e8  2.85e8
6 MGTXP    Motor gasoline total end-use consumption.        3.83e8  2.85e8
```

```
seds.series %>%
  filter(grepl("Residual fuel oil", variable.desc1) &
           variable.desc2 == "Barrels") %>%
  select(-variable.desc2) %>%
  left_join(seds.complete %>%
              filter(year == 2006 & state.code == "CA" |
                       year == 2006 & state.code == "TX") %>%
              mutate(variable2 = paste0(state.code, year)) %>%
              select(variable, variable2, value) %>%
              spread(variable2, value),
            by = "variable") %>%
  arrange(variable.desc1) %>%
  as.tibble
```

```
# A tibble: 6 x 4
  variable variable.desc1                                    CA2006  TX2006
  <chr>    <chr>                                              <dbl>   <dbl>
1 RFCCP    Residual fuel oil consumed by the commercial ~        0  0.
2 RFEIP    Residual fuel oil consumed by the electric po~    15000  5.50e4
3 RFICP    Residual fuel oil consumed by the industrial ~   102000  3.92e6
4 RFACP    Residual fuel oil consumed by the transportat~ 37614000  2.40e7
5 RFTCP    Residual fuel oil total consumption.           37731000  2.80e7
6 RFTXP    Residual fuel oil total end-use consumption.   37715000  2.79e7
```

```
seds.series %>%
  filter(grepl("Distillate fuel oil", variable.desc1) &
           variable.desc2 == "Thousand barrels") %>%
  select(-variable.desc2) %>%
  left_join(seds.complete %>%
              filter(year == 2006 & state.code == "CA" |
                       year == 2006 & state.code == "TX") %>%
```

```
              mutate(variable2 = paste0(state.code, year)) %>%
              select(variable, variable2, value) %>%
              spread(variable2, value),
            by = "variable") %>%
  arrange(variable.desc1) %>%
  as.tibble
```

```
# A tibble: 0 x 4
# ... with 4 variables: variable <chr>, variable.desc1 <chr>,
#   CA2006 <dbl>, TX2006 <dbl>
```

```
seds.series %>%
  filter(grepl("road oil", variable.desc1) &
           variable.desc2 == "Barrels") %>%
  select(-variable.desc2) %>%
  left_join(seds.complete %>%
              filter(year == 2006 & state.code == "CA" |
                       year == 2006 & state.code == "TX") %>%
              mutate(variable2 = paste0(state.code, year)) %>%
              select(variable, variable2, value) %>%
              spread(variable2, value),
            by = "variable") %>%
  arrange(variable.desc1) %>%
  as.tibble
```

```
# A tibble: 6 x 4
  variable variable.desc1                                    CA2006  TX2006
  <chr>    <chr>                                              <dbl>   <dbl>
1 ARICP    Asphalt and road oil consumed by the industria~  1.21e7  1.57e7
2 ARTCP    Asphalt and road oil total consumption.          1.21e7  1.57e7
3 ARTXP    Asphalt and road oil total end-use consumption.  1.21e7  1.57e7
4 P1TCP    "Asphalt and road oil, aviation gasoline, kero~  6.80e7  2.83e8
5 P1TXP    "Asphalt and road oil, aviation gasoline, kero~  6.45e7  2.80e8
6 P1ICP    "Asphalt and road oil, kerosene, lubricants, a~  6.13e7  2.77e8
```

Extract:

## Computing Environment

```
Sys.time()
```

```
## [1] "2018-09-27 09:58:33 PDT"
```

```
sessionInfo()
```

```
## R version 3.5.1 (2018-07-02)
## Platform: x86_64-apple-darwin15.6.0 (64-bit)
## Running under: macOS High Sierra 10.13.6
##
## Matrix products: default
## BLAS: /Library/Frameworks/R.framework/Versions/3.5/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/3.5/Resources/lib/libRlapack.dylib
##
## locale:
```

```
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] bindrcpp_0.2.2  forcats_0.3.0   stringr_1.3.1   dplyr_0.7.6
##  [5] purrr_0.2.5     readr_1.1.1     tidyr_0.8.1     tibble_1.4.2
##  [9] ggplot2_3.0.0   tidyverse_1.2.1
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_0.12.18     cellranger_1.1.0 pillar_1.3.0     compiler_3.5.1
##  [5] plyr_1.8.4       bindr_0.1.1      tools_3.5.1      digest_0.6.15
##  [9] lubridate_1.7.4  jsonlite_1.5     evaluate_0.11    nlme_3.1-137
## [13] gtable_0.2.0     lattice_0.20-35  pkgconfig_2.0.2  rlang_0.2.2
## [17] cli_1.0.0        rstudioapi_0.7   yaml_2.2.0       haven_1.1.2
## [21] withr_2.1.2      xml2_1.2.0       httr_1.3.1       knitr_1.20
## [25] hms_0.4.2        rprojroot_1.3-2  grid_3.5.1       tidyselect_0.2.4
## [29] glue_1.3.0       R6_2.2.2         fansi_0.3.0      readxl_1.1.0
## [33] rmarkdown_1.10   modelr_0.1.2     magrittr_1.5     backports_1.1.2
## [37] scales_1.0.0     htmltools_0.3.6  rvest_0.3.2      assertthat_0.2.0
## [41] colorspace_1.3-2 utf8_1.1.4       stringi_1.2.4    lazyeval_0.2.1
## [45] munsell_0.5.0    broom_0.5.0      crayon_1.3.4
```