

Ching's Week-10 diary on Webpage

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2023-10-15

Week 9

(1) What is the topic that you have finalized? (Answer in 1 or 2 sentences)

Food Waste Data Analysis

(2) What are the data sources that you have curated so far? (Answer 1 or 2 sentences).

Recycling statistics per type of waste for 2018-2022

Source: <https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling>

(Continuation) Week 10

(1) What is the question that you are going to answer? (Answer: One sentence that ends with a question mark that could act like the title of your data story)

Learn how much Singapore is saving energy per years by recycling plastics, paper, glass, ferrous and non-ferrous metal.

(2) Why is this an important question? (Answer: 3 sentences, each of which has some evidence, e.g., "According to the United Nations..." to justify why the question you have chosen is important)

In Singapore's quest to achieve zero-waste status, the looming challenge of increased waste disposal.

Coupled with Semakau Landfill's impending limit by 2035, necessitates urgent action.

The city-state, facing a shortage of land for waste facilities, responds with a unique strategy—inspiring citizens through the revelation of yearly energy savings from collective recycling efforts.

(3) Which rows and columns of the dataset will be used to answer this question? (Answer: Actual names of the variables in the dataset that you plan to use).

I will be using Recycling statistics to calculate energy saved every year from 2003 to 2022 based on 6 waste types: plastics, paper, glass, ferrous, non-ferrous metal and food.

#Problem Encounter 1

```
knitr::include_graphics("problem1.png")
```

```
41 {r, eval=T,echo=TRUE}
42 ## Loading Data
43 install.packages("tidyverse")
44 library(tidyverse)
45 install.packages("plotly")
46 library(plotly)
47 install.packages("shiny")
48 library(shiny)
49
50 # Reading the CSV files
51 energy_saved <- read.csv('2003_2022_waste.csv')
52 waste_03_22 <- read.csv('waste_energy_stats.csv')
53
54
55
56
```

43:1 | Chunk 2 | R Markdown

Console | Terminal | Background Jobs

R 4.3.1 · ~/GitHub/NM2207_CHING/WEEK 10/

```
In file(file, "rt") :
cannot open file 'waste_energy_stats.csv': No such file or director
y
> setwd("~/GitHub/NM2207_CHING/WEEK 10")
> energy_saved <- read.csv('2003_2022_waste.csv')
> > waste_03_22 <- read.csv('waste_energy_stats.csv')
Error: unexpected '>' in ">"
> energy_saved <- read.csv('2003_2022_waste.csv')
> > waste_03_22 <- read.csv('waste_energy_stats.csv')
Error: unexpected '>' in ">"
> energy_saved <- read.csv('2003_2022_waste.csv')
> waste_03_22 <- read.csv('waste_energy_stats.csv')
Error in file(file, "rt") : cannot open the connection
In addition: Warning message:
In file(file, "rt") :
cannot open file 'waste_energy_stats.csv': No such file or director
y
> |
```

Files | Plots | Packages | Help

GitHub > NM2207_CHING > WEEK 10

Name

- ..
- 2003_2022_waste.csv
- waste_energy_stat.csv
- waste-and-recycling-statistics-2...
- waste-and-recycling-statistics-2...
- WEEK10.Rmd

Overcome: by typing separate lines instead of just throwing both at the same time.

#Problem Encounter 2

```
knitr::include_graphics("problem2.png")
```

```

50 # Reading the CSV files
51 energy_saved <- read.csv('2003_2022_waste.csv')
52 waste_03_22 <- read.csv('waste_energy_stats.csv')
53
54 # Cleaning Data
55
56 clean_waste_03_22 <- waste_03_22 %>%
57   rename(
58     waste_type = "Waste Type",
59     total_waste_generated_tonne = "Total Generated ('000
60     tonnes)",
61     total_waste_recycled_tonne = "Total Recycled ('000
62     tonnes)",
63     year = "Year"
64   ) %>%
65   mutate(
66     total_waste_generated_tonne = total_waste_generated_tonne *
67     1000,
68     total_waste_recycled_tonne = total_waste_recycled_tonne *
69     1000
70   )

```

waste_... 300 obs. of 4 ...

Files Plots Packages Help

GitHub > NM2207_CHING > WEEK 10 > ...

Name

..

2003_2022_waste.csv

problem1.png

waste-and-recycling-statistics-2...

waste-and-recycling-statistics-2...

WEEK10.Rmd

waste_energy_stat.csv

74:40 Chunk 3 R Markdown

Console Terminal x Render x Background Jobs x

.../WEEK 10/WEEK10.Rmd

processing file: WEEK10.Rmd

quitting from lines 42-67 [unnamed-chunk-1] (WEEK10.Rmd)

Error in `file()`:
! cannot open the connection

Backtrace:

1. utils::read.csv("waste_energy_stats.csv")
2. utils::read.table(...)
3. base::file(file, "rt")

Execution halted

Overcome: by typing "waste_energy_stat.csv" instead of "waste_energy_stat(s).csv" -> careless typing

#Problem Encounter 3

```
knitr::include_graphics("problem3.png")
```

```

50 # Reading the CSV files
51 energy_saved <- read.csv('2003_2022_waste.csv')
52
53 waste_03_22 <- read.csv('waste_energy_stat.csv')
54
55 # Cleaning Data
56
57 clean_waste_03_22 <- waste_03_22 %>%
58   rename(
59     waste_type = "Waste Type",
60     total_waste_generated_tonne = "Total Generated ('000
61     tonnes)",
62     total_waste_recycled_tonne = "Total Recycled ('000
63     tonnes)",
64     year = "Year"
65   ) %>%
66   mutate(
67     total_waste_generated_tonne = total_waste_generated_tonne *
68     1000,
69     total_waste_recycled_tonne = total_waste_recycled_tonne *
70     1000
71   )

```

waste_... 300 obs. of 4 ...

Files Plots Packages Help

GitHub > NM2207_CHING > WEEK 10 ...

Name

- 2003_2022_waste.csv
- problem1.png
- waste-and-recycling-statistics-2...
- waste-and-recycling-statistics-2...
- WEEK10.Rmd
- waste_energy_stat.csv
- problem2.png

Console Terminal Render Background Jobs

.../WEEK 10/WEEK10.Rmd

```

processing file: WEEK10.Rmd
|.....| 57% [unnamed]
-chunk-1]
Quitting from lines 42-68 [unnamed-chunk-1] (WEEK10.Rmd)
Error in `rename()`:
! Can't rename columns that don't exist.
X Column `Waste Type` doesn't exist.
Backtrace:
1. ... %>% ...
4. dplyr::rename.data.frame(...)

Execution halted

```

Overcome: Confirm column names mentioned in the 'rename' and 'mutate' function exist in the CSV. They are also case-sensitive, so make sure there are no typos.

#Problem Encounter 4

```
knitr::include_graphics("problem4.png")
```

```

45 #install.packages("plotly")
46 library(plotly)
47 #install.packages("shiny")
48 library(shiny)
49
50 # Reading the CSV files
51 energy_saved <- read.csv('2003_2022_waste.csv')
52
53 waste_03_22 <- read.csv('waste_energy_stat.csv')
54
55 # Cleaning Data
56 clean_waste_03_22 <- waste_03_22 %>%
57   rename(
58     waste_type = "Waste Type",
59     total_waste_generated_tonne = "Total Generated ('000
60     tonnes)",
61     total_waste_recycled_tonne = "Total Recycled ('000
62     tonnes)",
63     year = "Year"
64   ) %>%
65   mutate(
66     total_waste_generated_tonne = total_waste_generated_tonne *
67     1000,
68     total_waste_recycled_tonne = total_waste_recycled_tonne *
69     1000
70   )

```

Overcome: Rearrange the data

Overview of the Introduction of the webpage: Learn how much Singapore is saving energy per years by recycling plastics, paper, glass, ferrous and non-ferrous metal.

Introduction of Narrative

In the heart of Singapore's bustling landscape, a groundbreaking initiative aims to turn the tide on the nation's mounting waste crisis. With the looming threat of Semakau Landfill reaching its limit by 2035 and a scarcity of land for new waste facilities, the urgency to address this issue has never been more apparent.

As the nation confronts this pressing challenge, a unique strategy unfolds—one that seeks to inspire citizens by revealing the potential energy savings derived from combined recycling efforts. The journey begins with a meticulous project of data cleansing and preparation, focusing on the Singapore NEA Energy Savings dataset (<https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling>), which sheds light on total garbage collection and recycling rates. However, the complexity deepens with the diversity in material names from various sources.

To bring the narrative up-to-date, the latest developments are seamlessly integrated, incorporating the 2022 data from waste statistics and overall recycling provided by the National Environment Agency. This ensures a comprehensive and current statistical analysis as the nation strives for a zero-waste future.

The quest for understanding extends beyond borders, drawing insights from Greentumble to gauge the energy production potential of recycling efforts (<https://greentumble.com/how-does-recycling-save-energy/>). The spotlight narrows onto five key waste types—plastics, paper, glass, ferrous, and non-ferrous metals—forming the cornerstone for calculating annual energy savings from 2003 to 2022. The hope is to propel Singapore toward a future where waste becomes not a problem but a source of renewed energy.

Amidst this environmental pursuit, the narrative weaves in elements of Singapore's unique relationship with food—a nation touted as a food paradise. The complexities of food security and waste management come to the forefront, challenging the conventional notion of waste. The thesis proposes a transformative approach to food waste management by harnessing it as a resource, exploring alternative architectural typologies for decentralized food waste-to-energy production in local neighborhoods.

This proposition not only aims to support closed-loop food systems but also challenges societal perceptions of "waste". This project reflects a holistic inquiry into the intricate relationships between food waste, technology, environment, culture, and society. It calls for a rethink of current waste management practices, emphasizing the potential of waste as a resource that can be repurposed, recycled, and given a second life.

In a city where waste is often out of sight, this narrative brings it to the forefront, proclaiming that not recycling waste is a missed opportunity. With an insatiable appetite for consumption, Singapore must take action to transform waste into a valuable resource, creating a sustainable future where the city's vibrancy is not overshadowed by the looming shadow of excess waste.