Data Visual: Transportation Emission by EV Charging Ports

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```
library(readxl)
library(ggplot2)
library(dplyr)
```

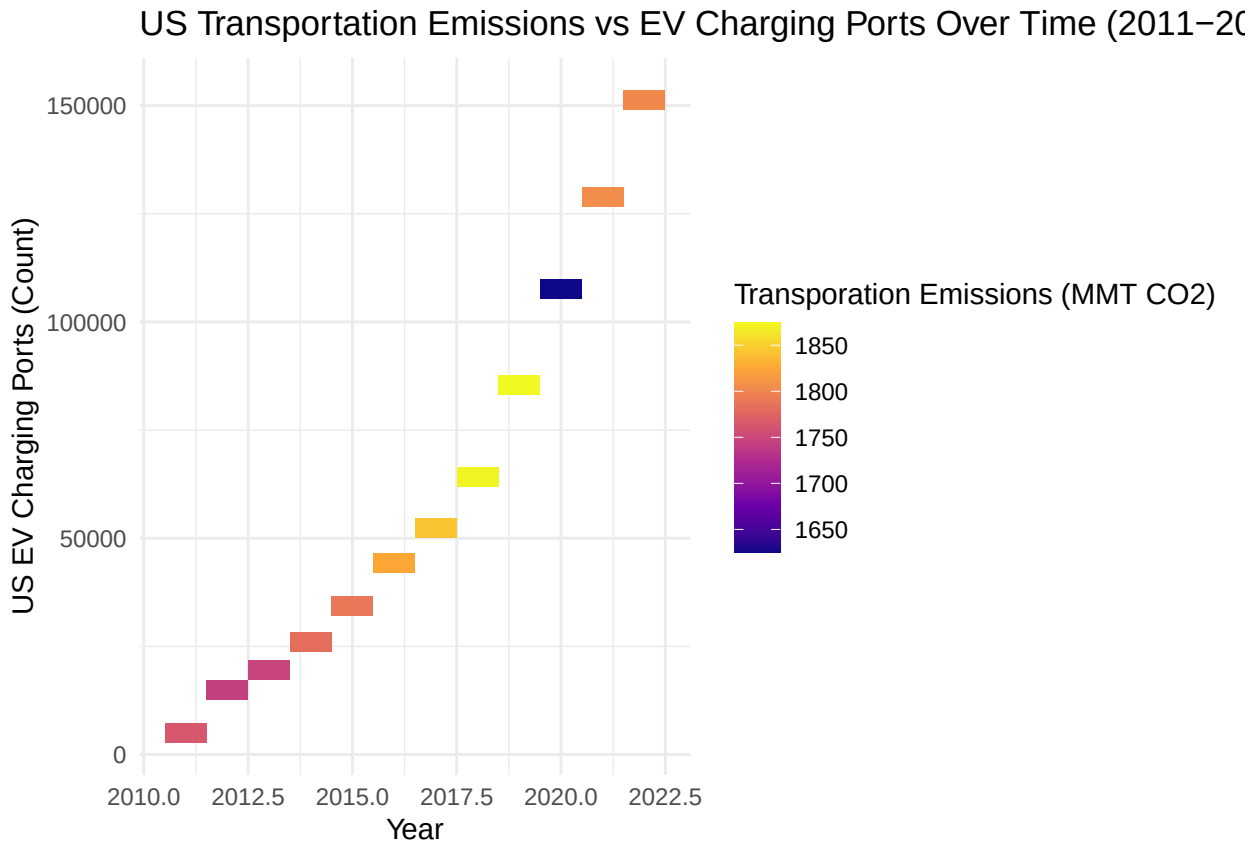
```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

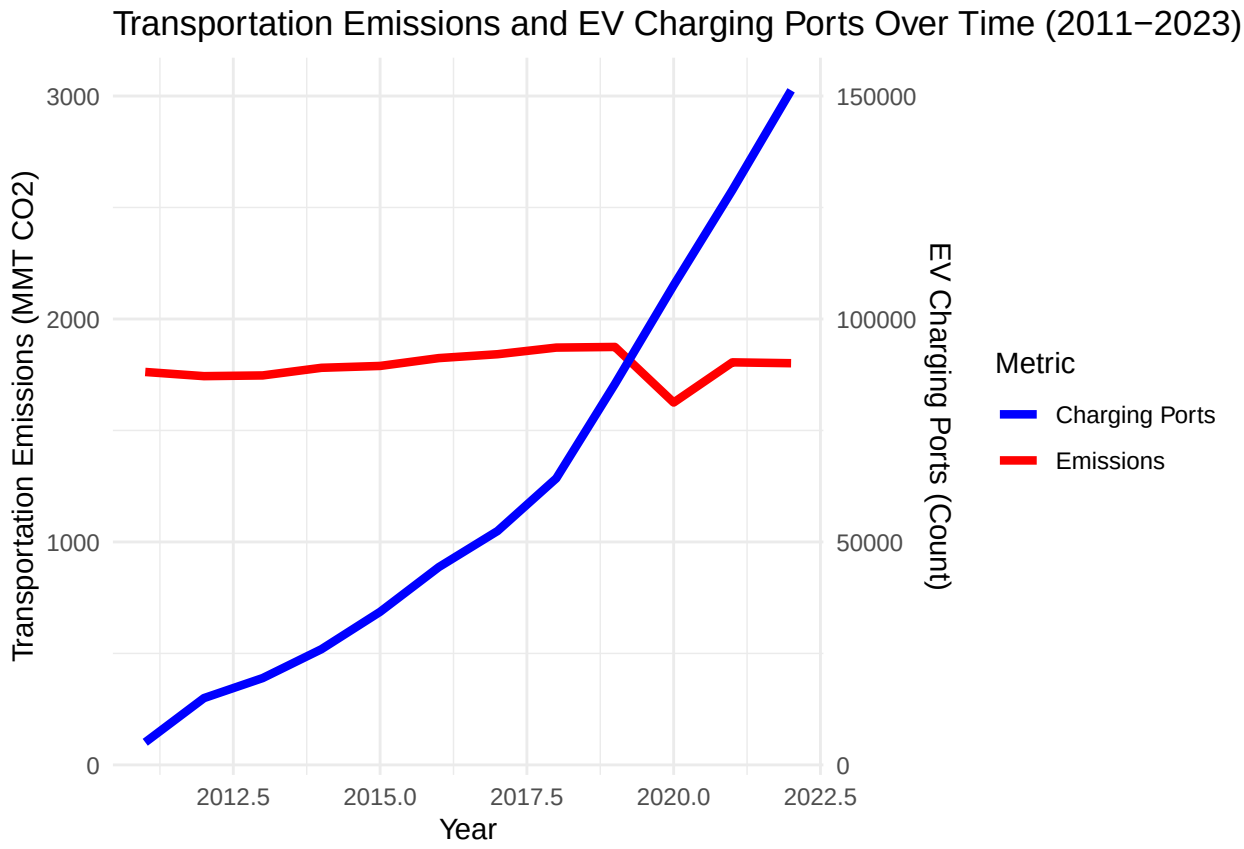
```
df <- read_excel("D:/Spring 2025/ENV 710 Stats/Rosie's Docs/Transportation Emissions and EV Ports 2011-2
                 skip = 2, col_names = c("Year", "TransportationEmissions",
                                         "Count_EV_Charging_Ports"))
```

```
# Heatmap
ggplot(df, aes(x = Year,
y = Count_EV_Charging_Ports,
fill = TransportationEmissions)) +
  geom_tile() +
  scale_fill_viridis_c(option = "plasma") +
  labs(
    title = "US Transportation Emissions vs EV Charging Ports Over Time (2011-2023)",
    x = "Year",
    y = "US EV Charging Ports (Count)",
    fill = "Transporation Emissions (MMT CO2)"
  ) +
  theme_minimal()
```




```
# Line plot with dual y-axes
ggplot(df, aes(x = Year)) +
  geom_line(aes(y = TransportationEmissions, color = "Emissions"), size = 1.5) +
  geom_line(aes(y = Count_EV_Charging_Ports / 50, color = "Charging Ports"),
            size = 1.5) +
  # Scale charging ports for better visualization
  scale_y_continuous(
    name = "Transportation Emissions (MMT CO2)",
    sec.axis = sec_axis(~ . * 50, name = "EV Charging Ports (Count)")
    # Secondary axis for charging ports
  ) +
  labs(
    title = "Transportation Emissions and EV Charging Ports Over Time (2011-2023)",
    x = "Year",
    color = "Metric"
  ) +
  theme_minimal() +
  scale_color_manual(values = c("Emissions" = "red", "Charging Ports" = "blue"))
```

```
## Warning: Using ‘size‘ aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use ‘linewidth‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```



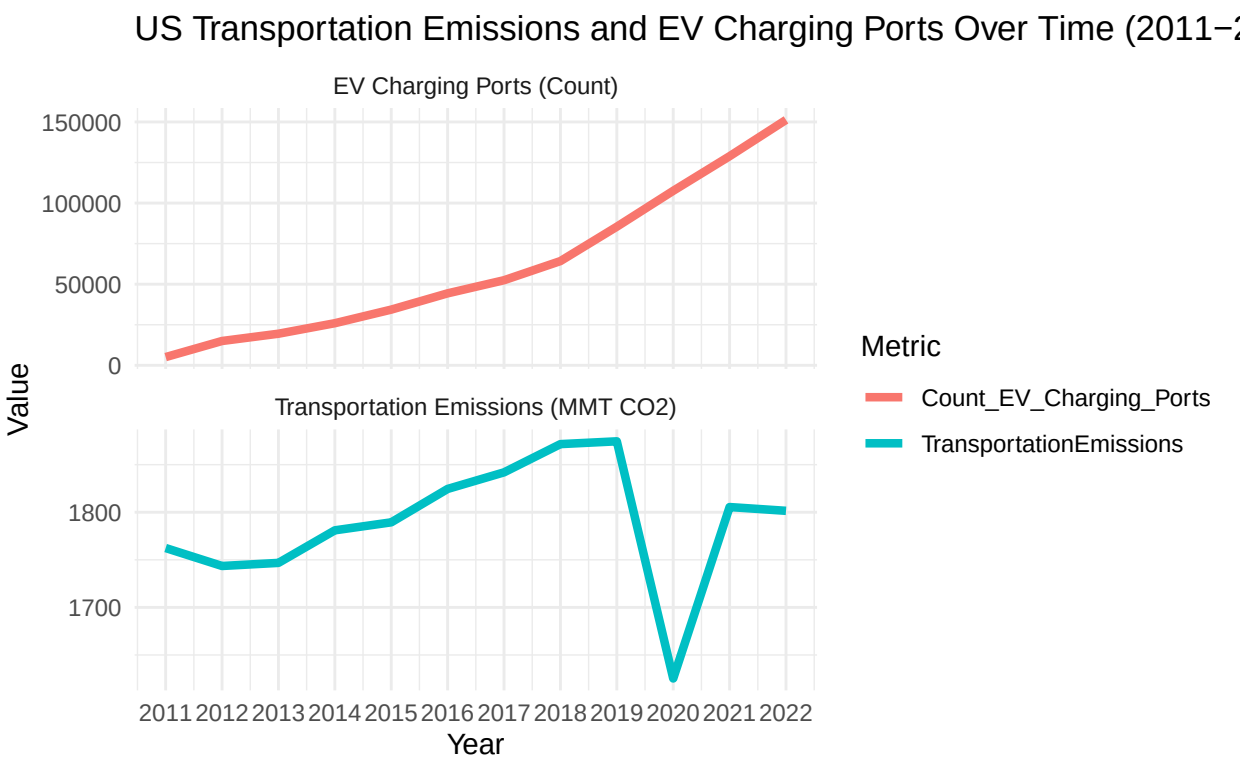

```r
# Convert to long format
df_long <- tidyr::pivot_longer(df, cols = c(TransportationEmissions,
                                            Count_EV_Charging_Ports),
                               names_to = "Metric", values_to = "Value")

# Ensure Year is numeric (if it's not already)
df_long$Year <- as.numeric(df_long$Year)

# Create custom facet labels
facet_labels <- c(
  "TransportationEmissions" = "Transportation Emissions (MMT CO2)",
  "Count_EV_Charging_Ports" = "EV Charging Ports (Count)"
)

# Create the faceted plot with custom facet titles
ggplot(df_long, aes(x = Year, y = Value, color = Metric)) +
  geom_line(size = 1.5) +
  facet_wrap(~ Metric, scales = "free_y", ncol = 1,
             labeller = labeller(Metric = facet_labels)) +
  scale_x_continuous(breaks = seq(min(df_long$Year), max(df_long$Year), by = 1)) +
  # Ensure integer years
  labs(
    title = "US Transportation Emissions and EV Charging Ports Over Time (2011-2022)",
    x = "Year",
    y = "Value",
    color = "Metric",
```

```
  caption = "Data Sources:\n- Environmental Protection Agency, U.S. Greenhouse Gas Inventory Data Expl
) +
theme_minimal()+
theme(plot.caption = element_text(hjust = 0, size = 9))
```



Data Sources:
− Environmental Protection Agency, U.S. Greenhouse Gas Inventory Data Explorer (cfpub.epa.gov/ghgd
− Alternative Fuels Data Center (afdc.energy.gov/stations/states)