01

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```
# Load packages ------------------------------------------------------------

library(tidyverse)
library(ggplot2)

# Load data ----------------------------------------------------------------

EV_2010_to_2021 <-
  read_csv('data_own/IEA-EV-data.csv')

# Data wrangling -----------------------------------------------------------

EV_cars_quantity <-
  EV_2010_to_2021 %>%
  filter(region %in%
           c('China', 'Europe', 'USA', 'India')) %>%
  filter(year %in%
           seq(2010, 2030, 5)) %>%
  filter(category != 'Projection-APS') %>%
  filter(parameter %in%
           c('EV stock')) %>%
  mutate(mode_new =
           if_else(mode == 'Cars',
                   'Cars',
                   'Vans, buses & trucks')) %>%
  group_by(region, year, mode_new) %>%
  summarise(value_new =
              sum(value))

  # Set the categorical variables as factors with certain orders

EV_cars_quantity$mode_new <-
  factor(EV_cars_quantity$mode_new,
         levels =
           c('Vans, buses & trucks', 'Cars'))

EV_cars_quantity$region <-
  factor(EV_cars_quantity$region,
         levels =

           # in alphabetical order

           c('China', 'Europe', 'India', 'USA'))
```

```
# Add percent numbers for reference

EV_cars_percent <-
  EV_cars_quantity %>%
  pivot_wider(names_from = mode_new,
              values_from = value_new) %>%
  mutate(percentage =
           formattable::percent(
             (`Vans, buses & trucks` /
                 (`Vans, buses & trucks` + `Cars`)))) %>%
  select(region, year, percentage)

# Combine the data together

EV_cars_all <-
  EV_cars_quantity %>%
  full_join(EV_cars_percent,
            by = join_by(region, year))

# Data visualization ----------------------------------------------------

p1 <-
  EV_cars_all %>%
  ggplot(mapping =
           aes(x = year,
               y = value_new,
               fill = mode_new)) +

  # only add some of the grid lines

  geom_hline(yintercept = 25000000,
             color = 'gray93') +
  geom_hline(yintercept = 50000000,
             color = 'gray93') +
  geom_hline(yintercept = 75000000,
             color = 'gray93') +
  geom_hline(yintercept = 100000000,
             color = 'gray93') +
  geom_bar(stat = 'identity',
           width = 3.2) +
  facet_wrap(~ region,
             nrow = 1) +
  geom_text(aes(label = percentage),
            size = 2.5,
            check_overlap = T) +
  scale_y_continuous(
    breaks = seq(0, 125000000, 25000000),
    labels = c('0', '25', '50', '75', '100', ''),
    limits = c(0, 125000000)) +
```

```
scale_fill_manual(values =
                    c('#4daf4a', '#377eb8')) +
labs(title = paste('Cars dominate vehicle electrification in the past,',
                   'present, and foreseeable future'),
     subtitle = paste('Electric vans, buses and trucks account for a little',
                      'proportion of electric vehicles in key markets worldwide'),
     caption = 'Data source: International Energy Agency',
     y = 'Million') +
theme_minimal() +
theme(axis.title.x = element_blank(),
      panel.grid = element_blank(),
      legend.position = 'none')
```