-

2019

```
library(readxl)
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

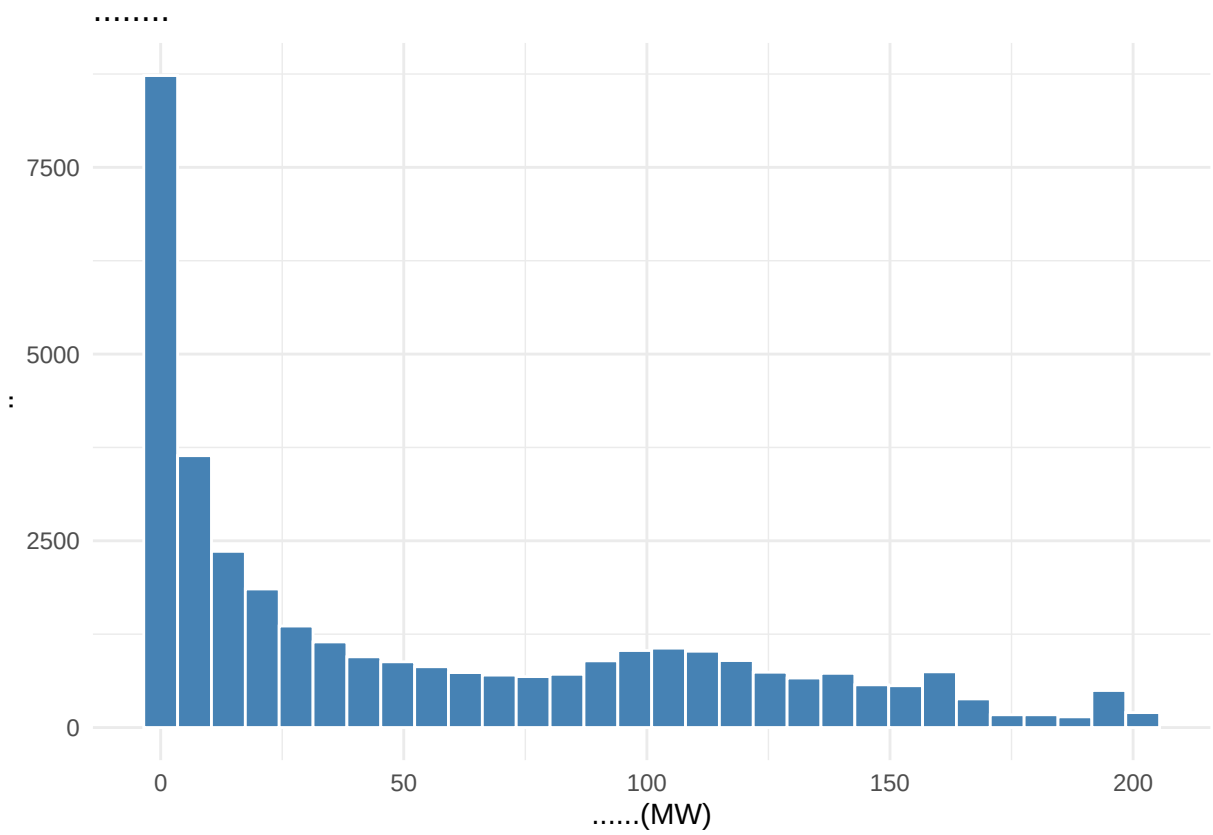
```
library(knitr)
data <- read_excel("./data/  2019.xlsx")
#   5  5
data %>%
  select(1:5) %>% #   5
  head(5) %>%
  kable(caption = "  2019  ")
```

Table 1: 2019

	mw	30m (m/s)	50m (m/s)	10m (°)
2019-01-01 00:00:00	0.979591	0	0.000	166.816
2019-01-01 00:15:00	1.150984	0	0.000	166.832
2019-01-01 00:30:00	1.066162	0	0.000	166.859
2019-01-01 00:45:00	0.923717	0	0.000	166.894
2019-01-01 01:00:00	0.813552	0	0.297	166.892

```
#
data <- data %>%
  mutate(
      = ymd_hms( ),          #
    month = month( , label = TRUE), #
    hour = hour( )              #
  )
```

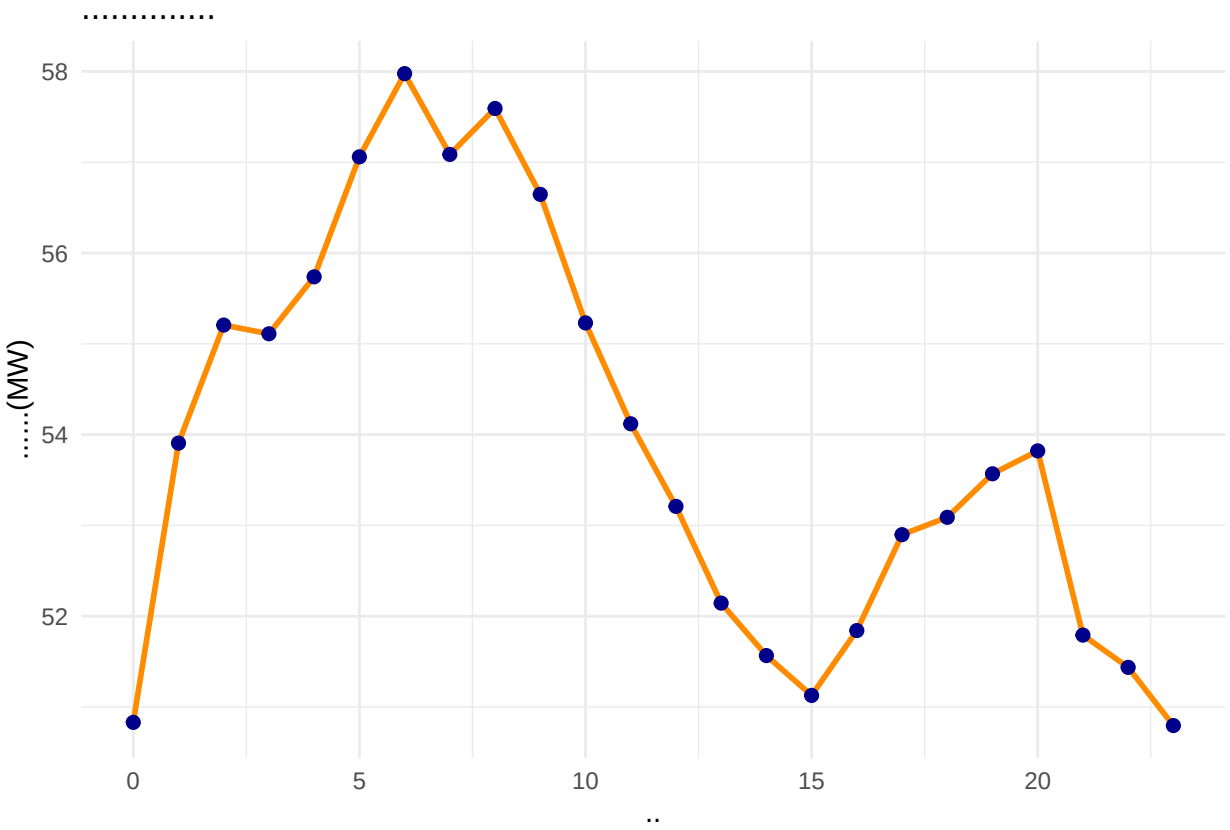
```r
ggplot(data, aes(x = `    mw `)) +
  geom_histogram(bins = 30, fill = "steelblue", color = "white") +
  labs(
    title = "     ",
    x = "    MW ",
    y = " "
  ) +
  theme_minimal()
```



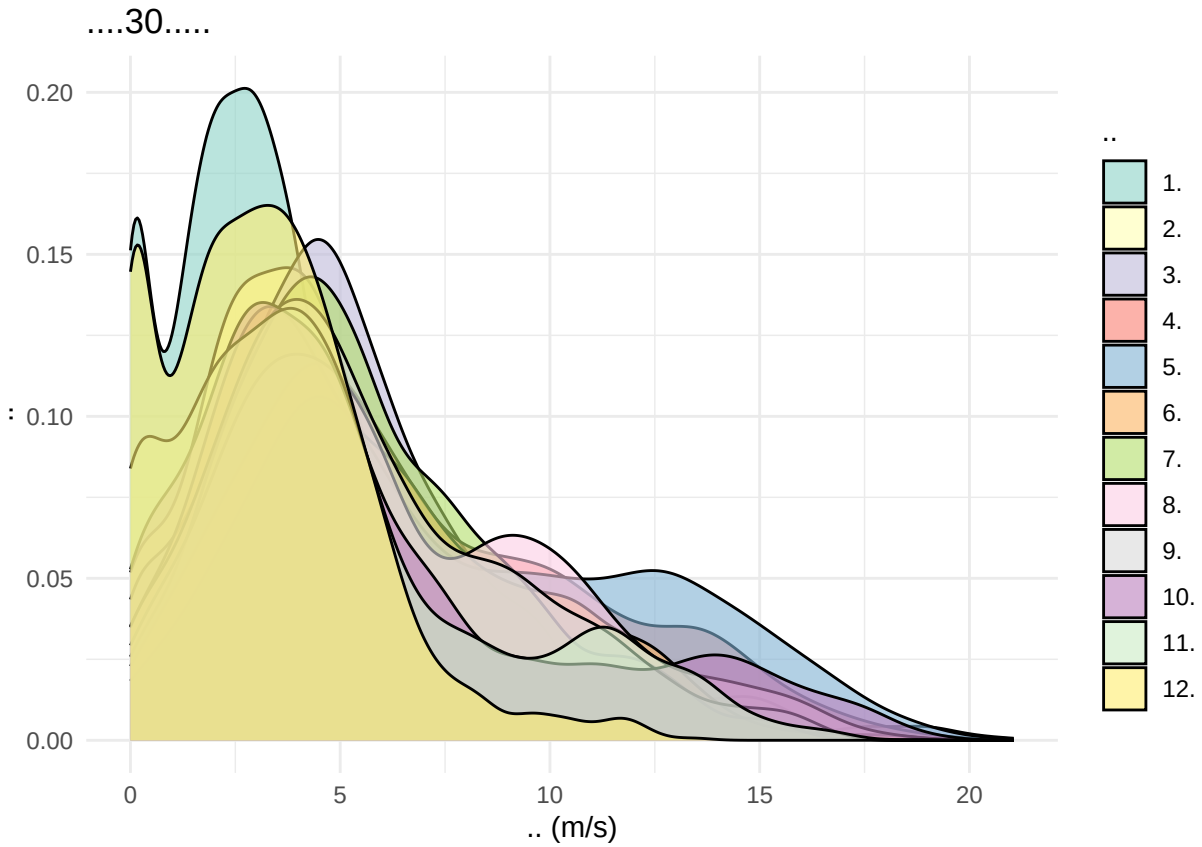

```r
hourly_data <- data %>%
  group_by(hour) %>%
  summarise(avg_power = mean(`    mw `, na.rm = TRUE))

ggplot(hourly_data, aes(x = hour, y = avg_power)) +
  geom_line(color = "darkorange", size = 1) +
  geom_point(color = "darkblue", size = 2) +
  labs(
    title = "        ",
    x = " ",
    y = "    MW "
```

```
  ) +
  theme_minimal()
```

```
## 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.
```




```
ggplot(data, aes(x = `  30m (m/s)`, fill = month)) +
  geom_density(alpha = 0.6) +
  scale_fill_brewer(palette = "Set3") +
  labs(
    title = "  30   ",
    x = "  (m/s)",
    y = " ",
    fill = " "
  ) +
  theme_minimal()
```


....30.....
0.20
0.15
0.10
0.05
0.00
:
0
5
10
15
20
.. (m/s)
..
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.