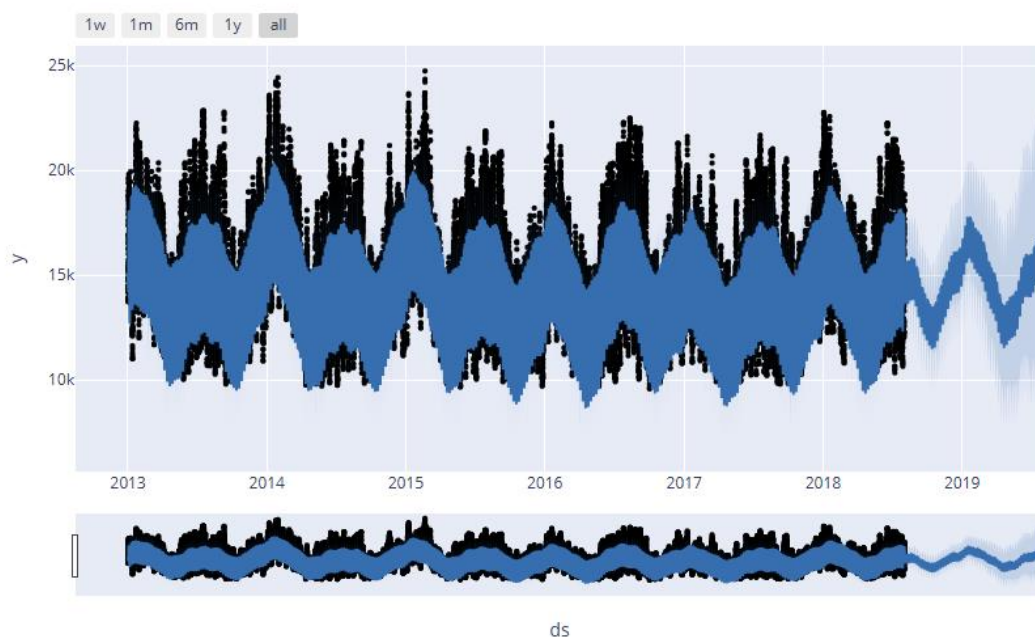


Model Results Analysis (Prophet)

In this project, a time series forecasting model was developed using the **Prophet** library to predict energy consumption trends. The model decomposed the time series into four main components:

1 Overall Trend

The trend component shows a relatively stable or slightly declining trajectory from 2013 to 2018. This suggests consistent consumption patterns over time, without significant long-term increases or decreases. The prediction towards 2019 shows higher uncertainty, as indicated by the wider forecast interval (confidence interval), which is typical when projecting further into the future.



2 Yearly Seasonality

Clear **annual consumption cycles** were detected:

- Increased consumption during the **winter months**.
- A noticeable drop in the **spring and early summer**.
- A new increase towards the **end of the year**.

This behavior suggests that energy demand is seasonally influenced, potentially due to heating, cooling needs, or changes in industrial/commercial activities.

3 Weekly Seasonality

Consumption patterns over the week show:

- **Higher demand during weekdays** (Monday to Friday).
- A significant drop during **weekends**, especially on **Sundays**.

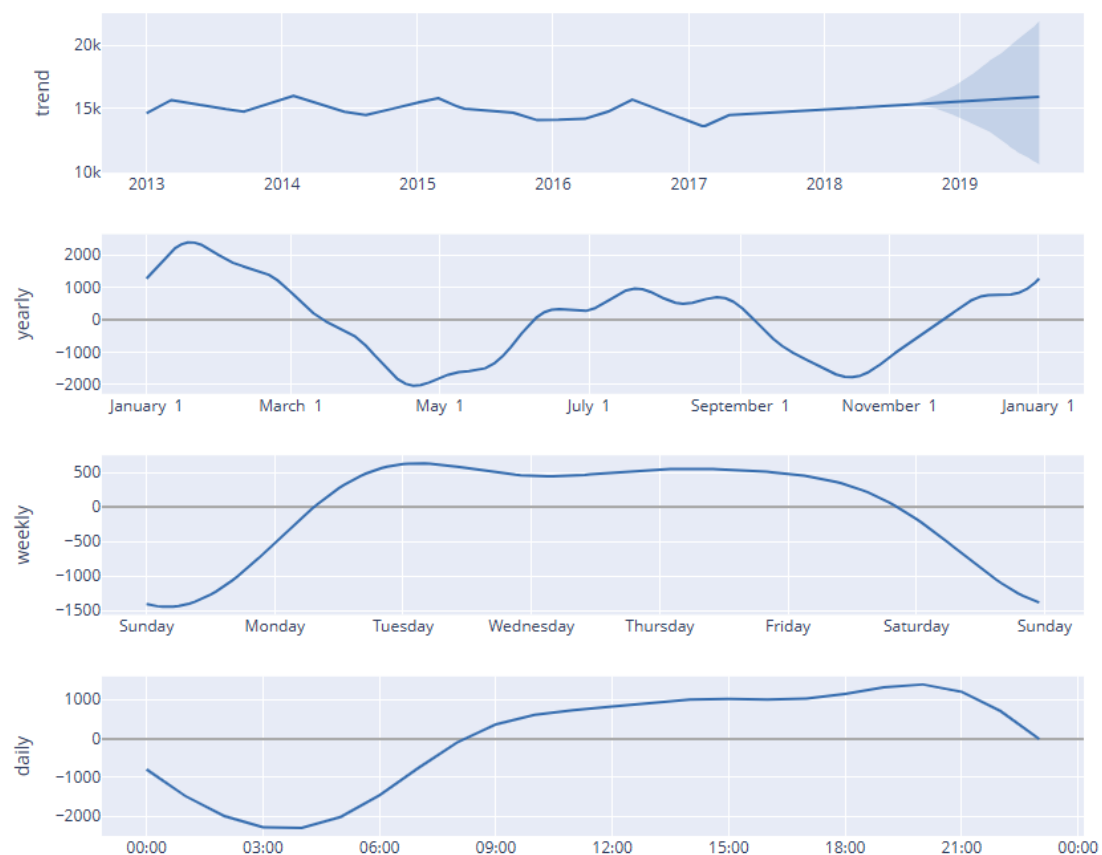
This is a typical consumption pattern for industrial or commercial energy users, where activity decreases during weekends.

4 Daily Seasonality

The daily cycle shows:

- **Lowest consumption during early morning hours** (00:00 – 06:00).
- Gradual increase starting in the morning, peaking in the **evening hours** (around 20:00 – 22:00).
- Decrease during the night.

This reflects the typical daily human activity cycle, with energy demand rising throughout the day.



Conclusion

The Prophet model effectively captured the long-term trend and significant seasonal patterns of energy consumption. The results provide valuable insights for energy planning and operational decision-making, particularly in environments where consumption follows regular seasonal and daily cycles.