

Electricity Generation Forecast in Canada 2000-2007

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Data Science Program

Characterize the electricity generation in a timespan

How many Megawatt-hours can be generated from 2000 to 2007 from previous decades?

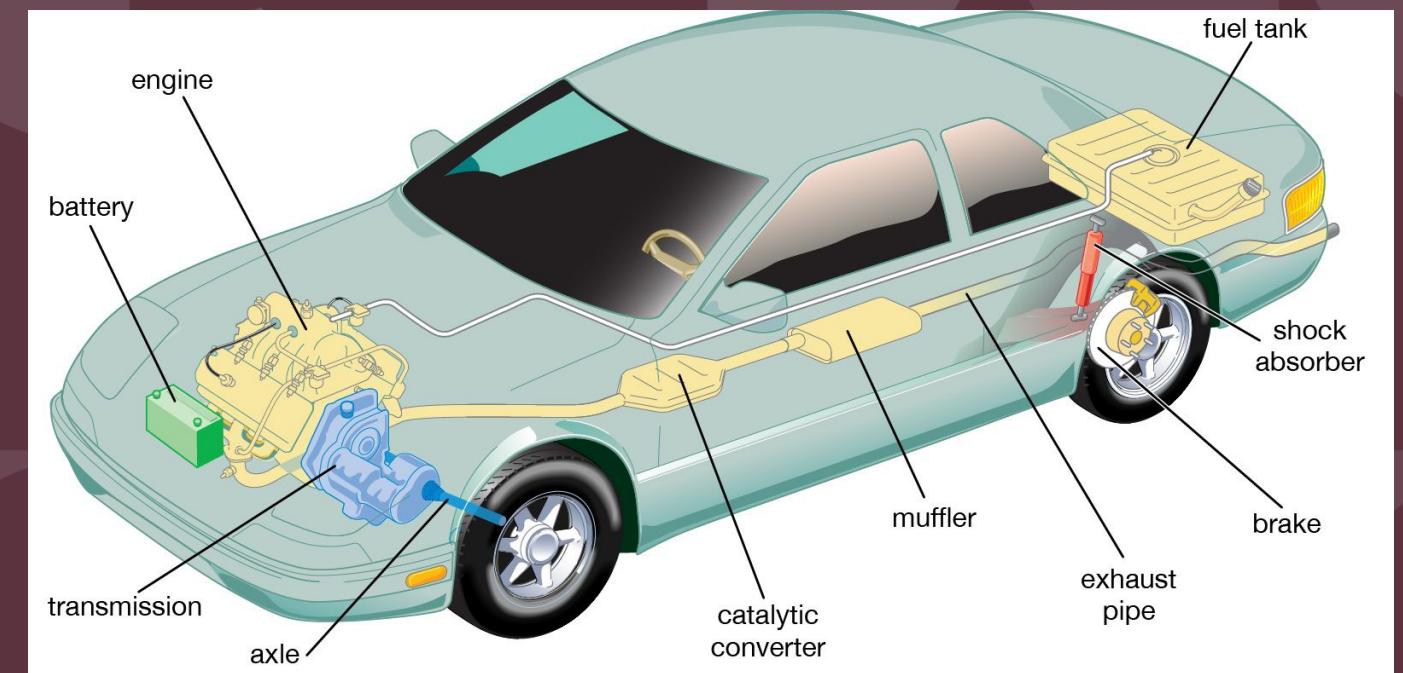
This was inspired to make a prediction for the next 5 years. However, the dataset on current values was drastically reduced after performing EDA.

Business Case

- How much will cost to produce electricity?
- How much expensive will be to consume/produce electricity?

What is a Megawatt - Hour?

- 1 Mwh = 1000 Kwh
- 10 automobile engines
- 330 homes



Data Description

The target observation will be Power Electricity scaled in Mega Watt-Hour.

It is calculated using the following equation:

$$P = IV$$

Where:

P=Power in Watts

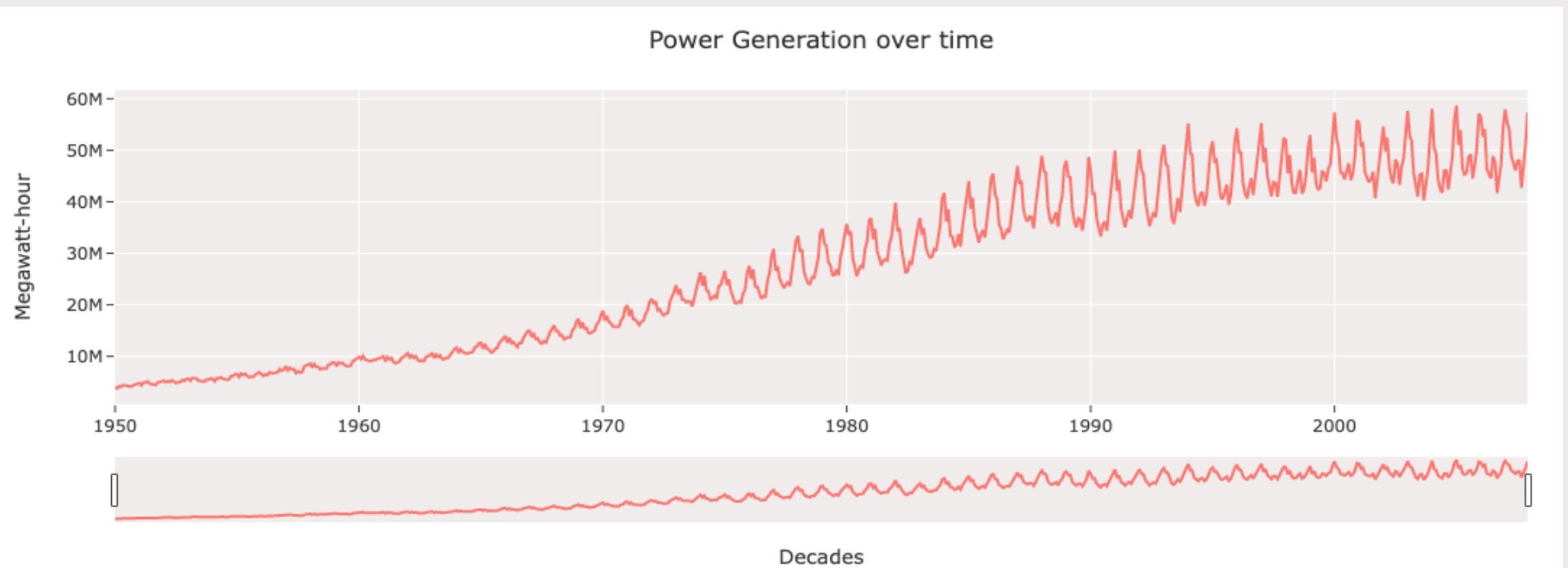
I=current in Ampers

V=Voltage in Volts

REF_DATE	POWER
1985-11-01	40,023,030
1970-01-01	18,869,000
2003-10-01	42,966,467
1959-05-01	8,739,000
1965-10-01	12,568,000
1979-04-01	28,312,703
1971-10-01	18,241,000
1997-07-01	43,816,610
1984-10-01	35,291,380
1960-03-01	10,071,000

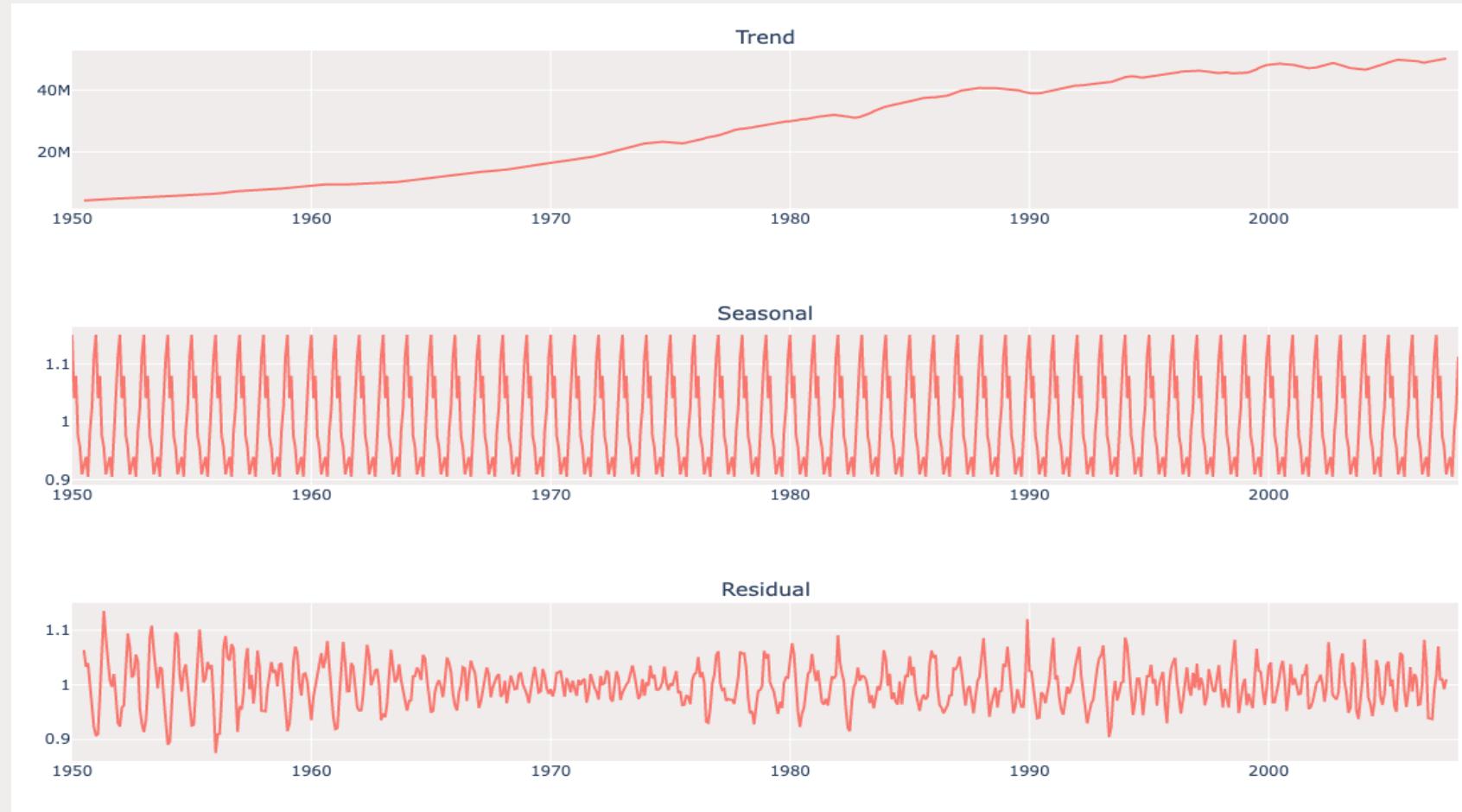
- Upward Trend
 - Higher Crest in Winter
 - Lower peak in summer
- Year Seasonality
- Fluctuating Variance

Original Data



Trend Decomposition

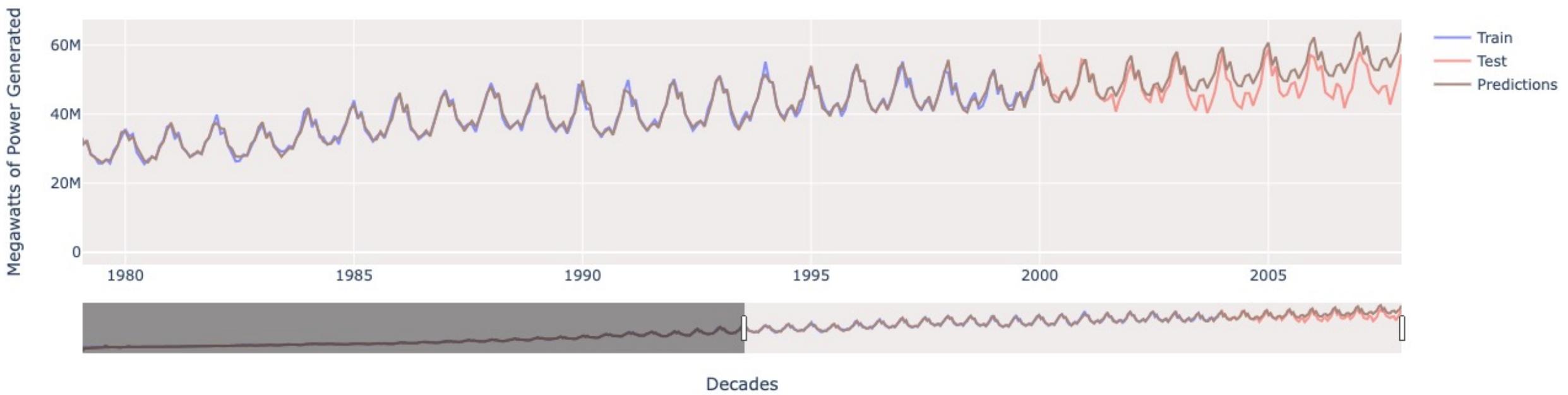
- Power generation growth
- Seasonality is cyclical and same pattern
- Residuals shows Heteroscedascity



ARIMA Grid Search

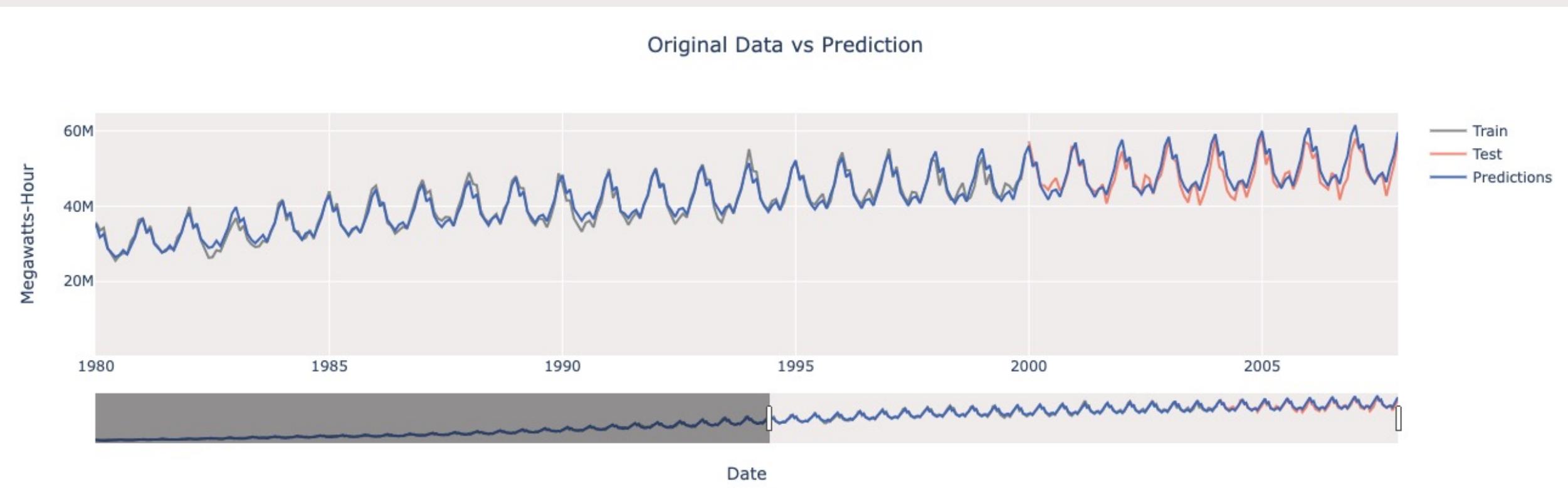
- Keep Waveform
- Upward
- MAPE Train 2.62%
- **MAPE Test 8.13%**

Original Data and Prediction With Seasonal Component



Facebook Prophet

- Multiplicative seasonality
- Canadian Holidays input
- User Friendly → Data Scientist Friendly
- MAPE Training 4.15%
- **MAPE Test 4.18 %**



Raw Cost of Electricity

Price per kwh:

Min \$0.99

Max \$1.06

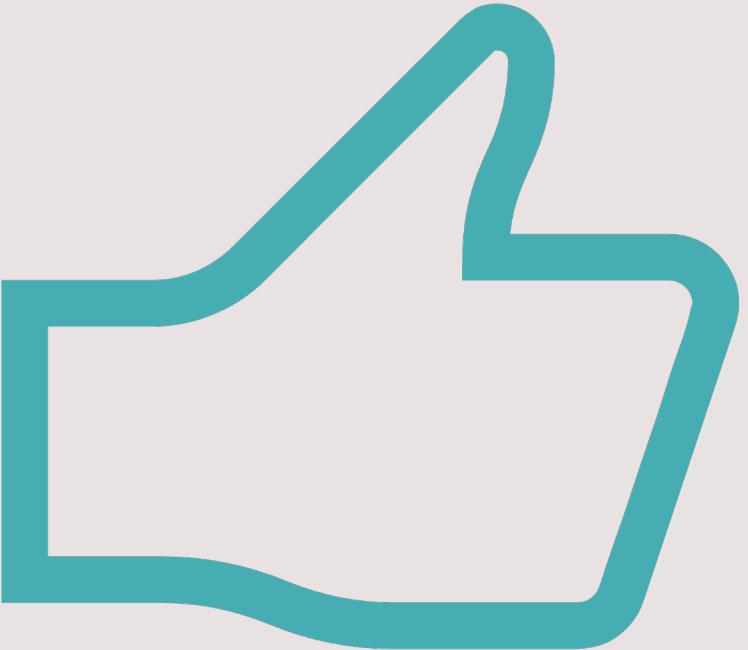


**Transmission and
Distribution costs Not
included**



Non-residential Electricity Sale in 2007





Gracias

Thank You

References

- Datasets:
 - [Power Dataset](#)
 - [Electric power selling price index\(non-residential\)](#)
- Electricity
 - Gorse, Christopher Johnston, David Pritchard, Martin. (2012). Dictionary of Construction, Surveying and Civil Engineering - electric power. (pp. 132). Oxford University Press. Retrieved from: <https://app.knovel.com/hotlink/pdf/id:kt00C1GZJ1/dictionary-construction/electric-power>