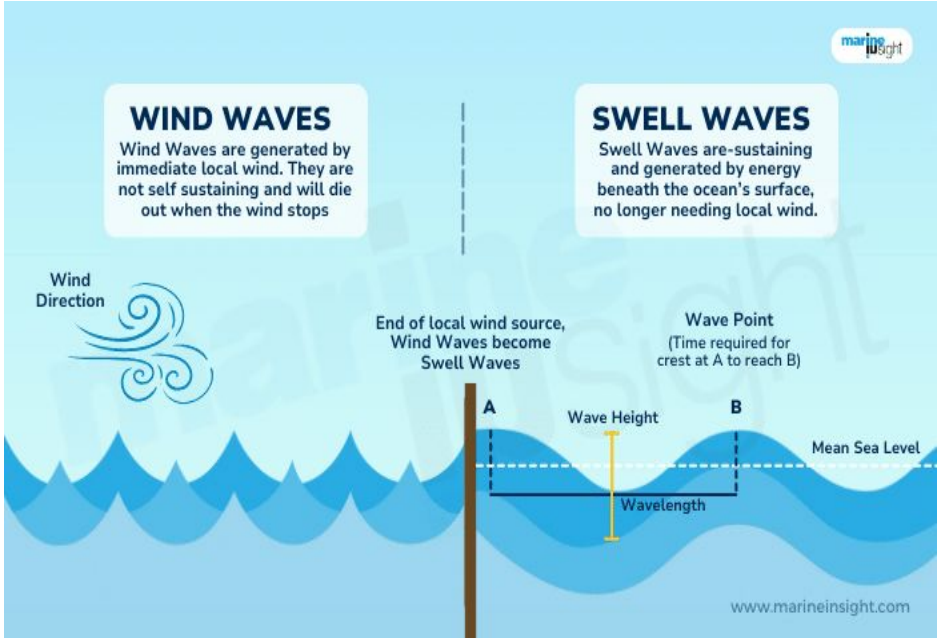
Wave Energy Prediction: Wave Energy forecasting for Tofino's Coastline

BrainStation Capstone Project

What are waves?

Waves transfer Energy from one place to another .

This project focuses on oceanic waves.



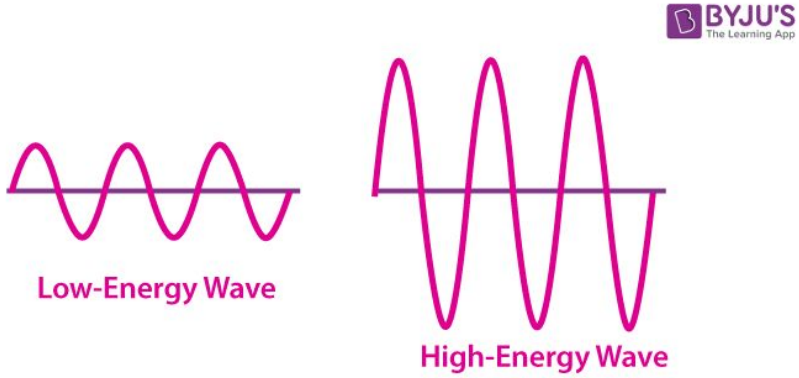
Subject Area Overview

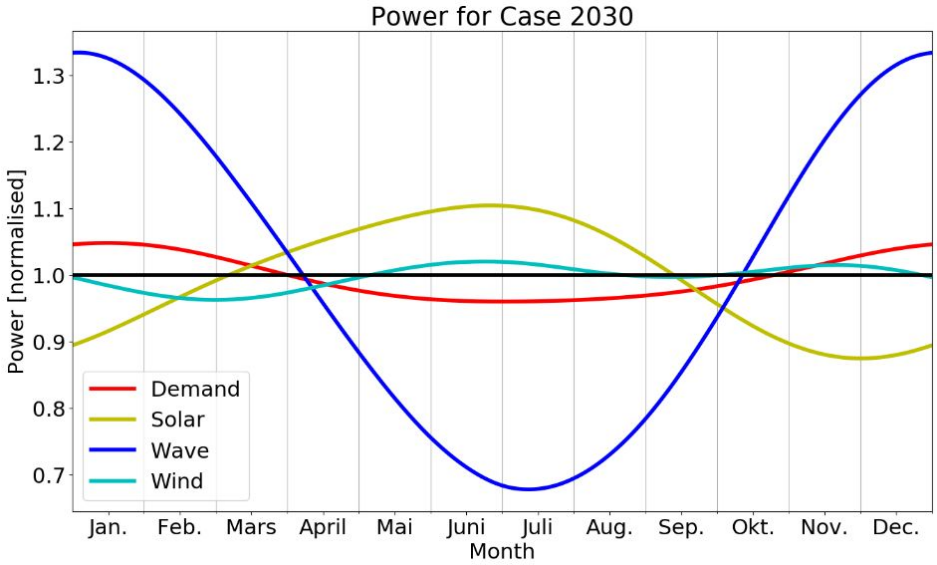
What is Wave Power?

Potential For Wave Power as Renewable Energy Resource

Importance of Understanding Wave Energy for Specific Location

Roughly 37 000 MW exists off Canada's Pacific coast, equal to more than 55% of the country's annual electricity consumption.





Problem Statement/Opportunity & Potential Impact

GOAL

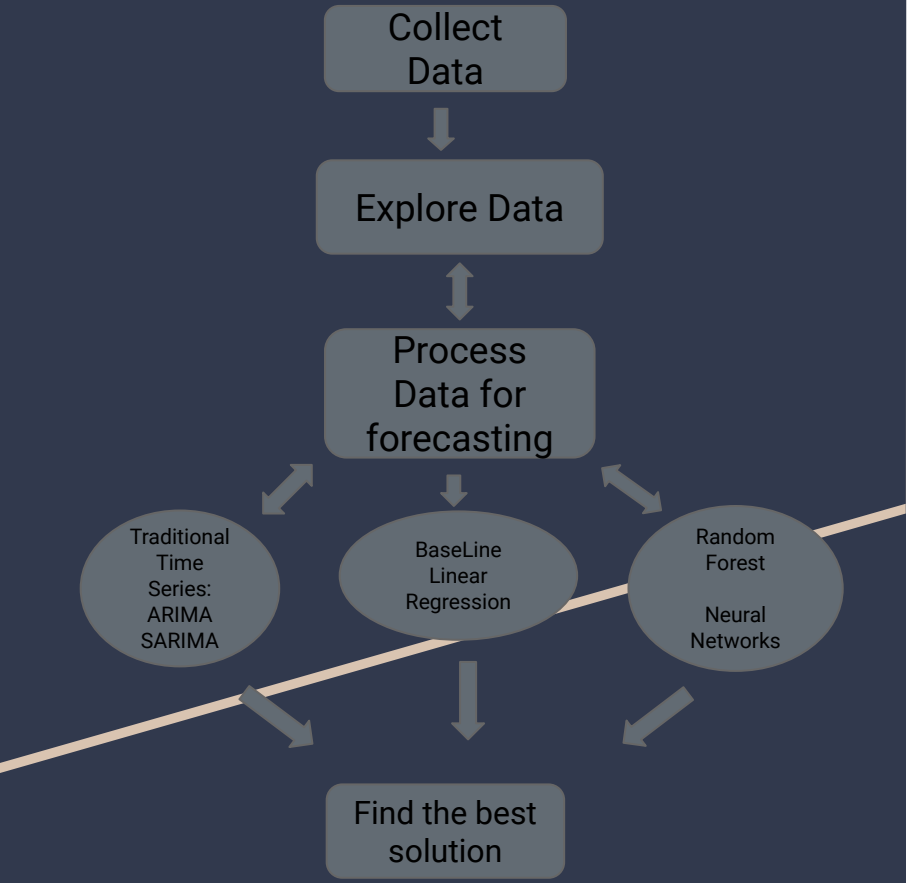
To better understand seasonal patterns in wave energy for a specific location and develop a short term forecasting model for this location.

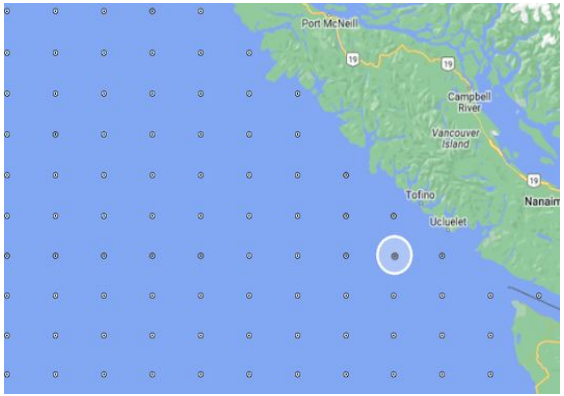
POTENTIAL IMPACT

Wave Energy Technology Development

Power Reserves

Approach



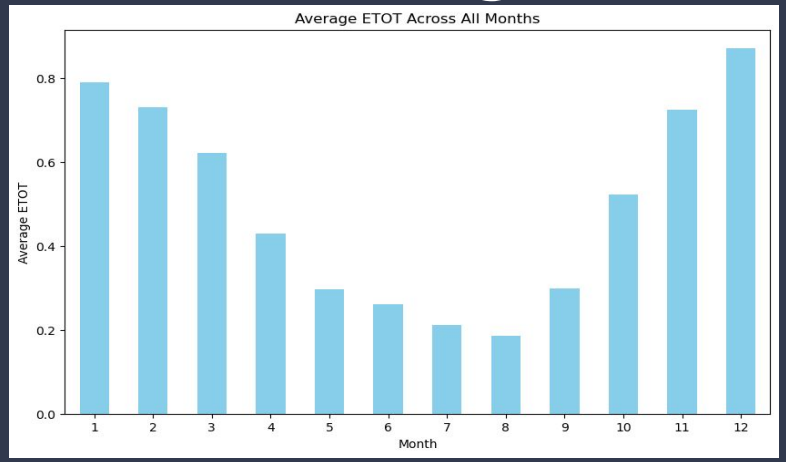


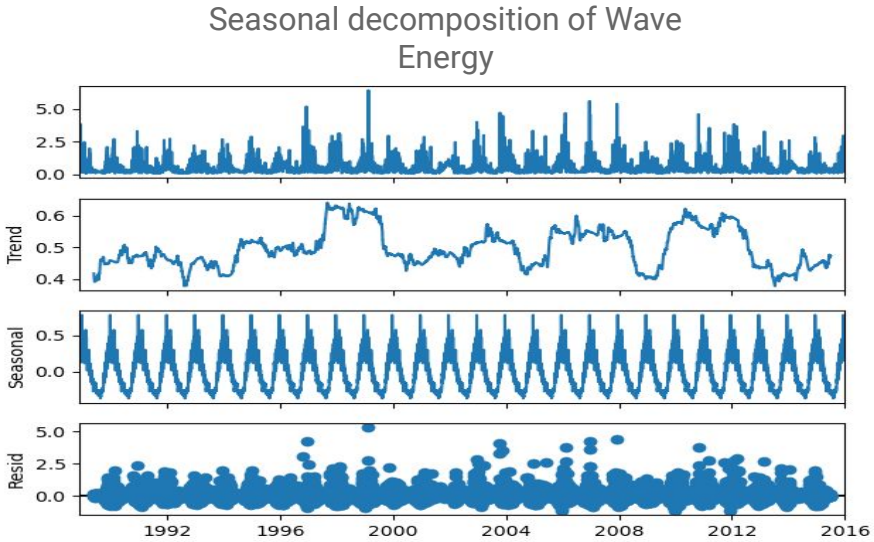
Data & Preprocessing

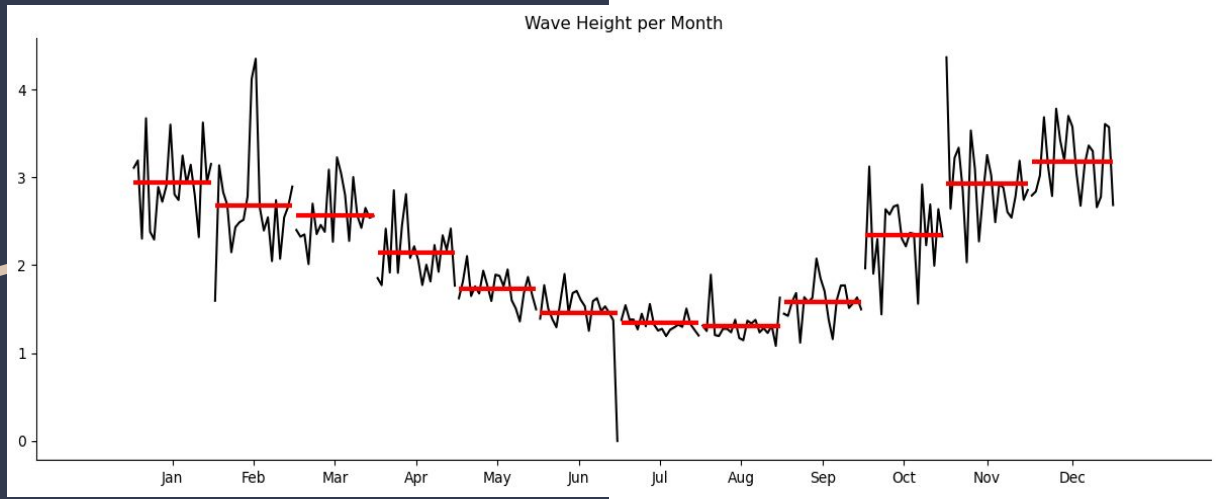
Hindcast numerical model
Historical buoy Data

Combined working DataFrame

EDA Insights

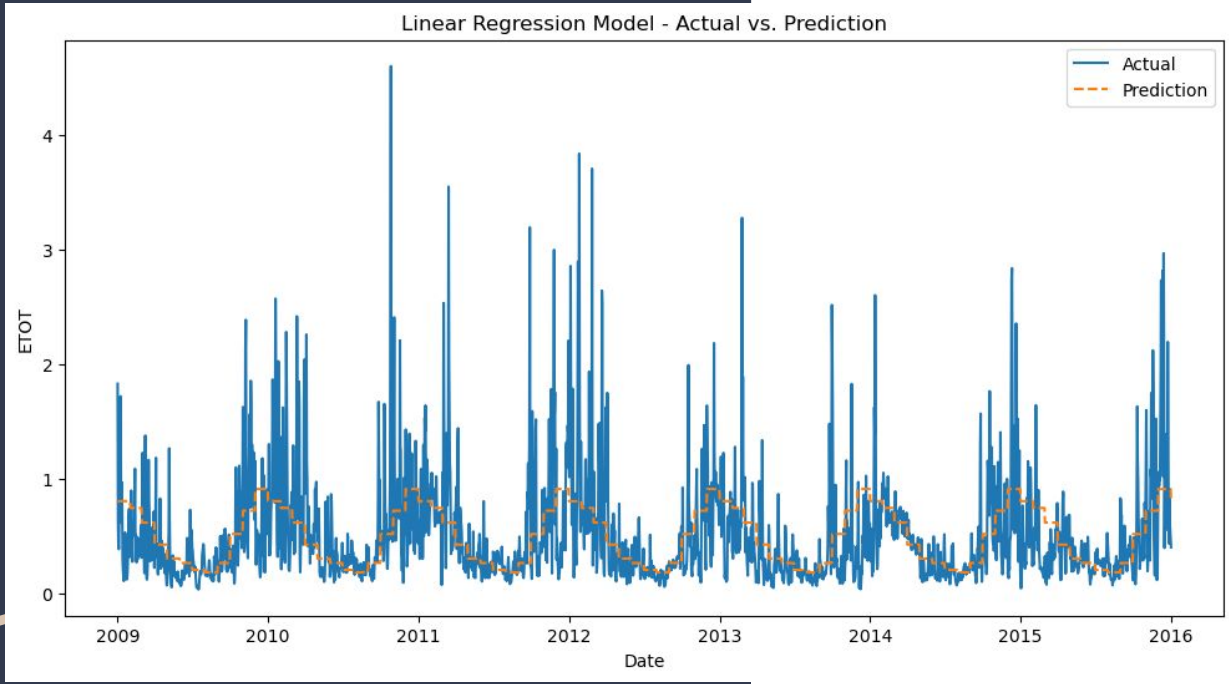






Baseline Modelling

- Baseline Linear Regression
- ARIMA fitted to Residuals



Next Steps:

- ARIMA (SARIMA)
- Feature Engineer
- Other models
- Live forecasting

Evaluation Metrics: MSE RMSE MAPE