BUSA8031
Business Analytics Project

MACQUARIE
University
SYDNEY·AUSTRALIA

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Due	10th June, 11:55 pm

Project Overview and Objectives

This Business Analytics project focuses on analyzing carbon emission intensity patterns across the National Electricity Market (NEM) in Australia. The main objectives are to identify national and regional trends, compare emission behavior between business and household consumption patterns, and analyze generator bidding strategies over time. The final goal is to produce strategic recommendations for investors targeting renewable and gas-fired generation assets. The story I presented in Question 2 moves from national intra-daily trends to regional differences, seasonal trends, positioning South Australia as a clean energy benchmark (also being more stable than Tasmania in terms of trends), followed by a user-type comparison where household consumption show lower emission intensity and insights on business electricity use.

Project Management and Scope

The team and I used an agile-based approach with weekly deliverables, tracked using Trello. Tasks were divided among group members based on questions. An agile based approach because we needed constant modifications to better our presentation and report. My focus was Question 2, which involved analyzing intra-daily carbon emission intensity curves and supporting the overall narrative with visualizations and predictive modelling. My work also informed conclusions for Question 5 and suggested choosing the full time frame from 2011 dataset to 2024 dataset, data cleaning and dataset merging part of Question 1.

Roles and Responsibilities

I took full ownership of Question 2 from data preparation to final presentation. This included data cleaning, visualization, predictive modelling, and voiceover presentation. I was also actively involved in integrating insights into the broader report and coordinating transitions between related sections.

Key responsibilities:

- Cleaned and aligned hourly carbon intensity data (2019–2025) and merged data (2011-2024).
- Built visualizations: line graphs, dual-axis charts, heatmaps, bar charts
- Applied Random Forest Regressor for forecasting 2026 emissions
- Connected findings to practical recommendations for Q5
- Designed slide visuals and narrated Q2 in the final video presentation

Lessons Learned

This project strengthened my skills in time-series data handling, Python (pandas, matplotlib), and machine learning with Random Forest. I gained experience in storytelling with data and structuring complex analysis into actionable insights. Using Trello also improved my project

coordination skills, helping track dependencies and visual polish. And used Google meet to conduct all the meetings.

Task Table

Task	Start–End Date	Time Spent (hrs)	Member Contribution
Dataset scoping, timestamp cleanup, planning (Project Initiation and Data Familiarizations (Week 1)	May 1–May 7	10 hrs	Reviewed CSIRO datasets, proposed extended window, handled column mismatch issues, dataset merging
Hourly alignment, regional extraction (Q2), data restructuring	May 8–May 14	8 hrs	Cleaned and prepared hourly carbon data for NSW, VIC, SA, TAS, QLD
Visualisation, In Depth Analysis and Insight Generation	May 15–May 21	15 hrs	Created graphs for hourly emissions, business vs household, and heatmaps
Random Forest modelling for Q5 support And Building the Story line	May 22–May 28	24 hrs	Trained and tuned model for 2026 forecast, building the story line of the presentation, extracted insights for policy advice
Presentation & final edits	May 29–June 10	24 hrs	Suggested Microsoft Power Point as the medium Designed Q2 slide visuals, voiceover recording, slide refinement, report editing

Total Time Contributed: 81 hours
Presentation Segment: Question 2 – Intra-daily carbon emission trends and household vs company comparison; For Reference Trello Board -