Executive Summary:

Data contains 1,688,950 entries with each entry representing one bus trip in Wellington between 1 January 2022 and 30 June 2023. Each entry has the following information:

* Actual Running Time
* Actual In-Service KM
* Passenger Km
* Scheduled In-Service Km
* Cancelled Trips (yes/no)
* Sched Running Time per Trip
* Route
* Route Variant
* Direction
* Trip Number
* Actual Vehicle Type
* Vehicle Number
* Vehicle Emissions Standard
* Start Minute(Sched)
* Day

1.1% of trips were removed because they look like train trips.

Unrealistic Actual Running Time was detected in 25 trips and was replaced with Scheduled Running Time.

We calculated Speed and Average Occupancy for each trip.

Unrealistic Speed of over 80KM/h was detected is 1.78% of trips and replaced with median speed for all trips of 24.14 KM/h.

We added 'TARE Weight (KG)', and 'Vehicle Registration Number' for each trip by merging this data with a file Feet Master File.

Proportion of trips with no TARE Weight and Vehicle Emission Standard data is 9.65 %. Most common emissions standard in this dataset is EURO6 (49.6% of entries). We replaced all “Unknown” Emissions standard (9.65% of the data) with EURO6. EURO6median TARE Weight of 7820 KG was used for those.

CO2e emissions, KG were calculated including:

* fuel emissions,
* oil emissions,
* emissions equivalent for N2O and CH4

Emissions Value, $ was calculated using Shadow Price of Carbon (NZ$2022 per tonne of CO2 equivalent) of $87.

Emissions Savings, $ were calculated and they represent the cost that is saved because the passengers use bus rather than a car.

This data was used for “Bus Carbon Emissions Wellington New Zealand 1/1/2022 - 1/6/2023” Dashboard

Next data was filtered for 2022/2023 Financial Year only and aggregated by Route, ay of Week and Trip Hour. Each trip was allocated proportionately to respective hour of the day:

* Count was used for Number of trips.
* Mean was used for Actual Running Time, Speed and Average Occupancy
* Sum was used for Actual in-service KM, Passenger KM, CO2emissions

Aggregated data has 7573 entries. Each entry represents a particular route on a particular hour of a particular weekday.

This aggregated data was used for “Hourly View. Bus Carbon Emissions Wellington New Zealand 1/6/2022 - 30/6/2023

Separately, data was aggregated per vehicle.

* Count was used for Number of trips and number of Cancelled Trips
* List was used to show all Routes and all Service Types for this vehicle
* Mean was used for, Speed and Average Occupancy
* Sum was used for Actual Running Time , Actual in-service KM, Passenger KM, CO2emissions, ‘Emissions Value, $’ and 'Emissions Savings, $'