

# Outlander PHEV

## Performance Review Data

**GELCOservices**  
Automotive Industry Consultants



# Background

GELCOservices is a company involved with Automotive Battery Technology and Electric Vehicle charging infrastructure.

Recent company growth – and branching out into the field of process control validation and calibration has led to an expansion of staff and fleet vehicles.

# Background – Reason for Purchase

A purpose built Technical Centre is underway at Parafield Gardens in Adelaide, equipped with the latest Test and Validation instrumentation as required to validate batteries performance in a Laboratory test environment.

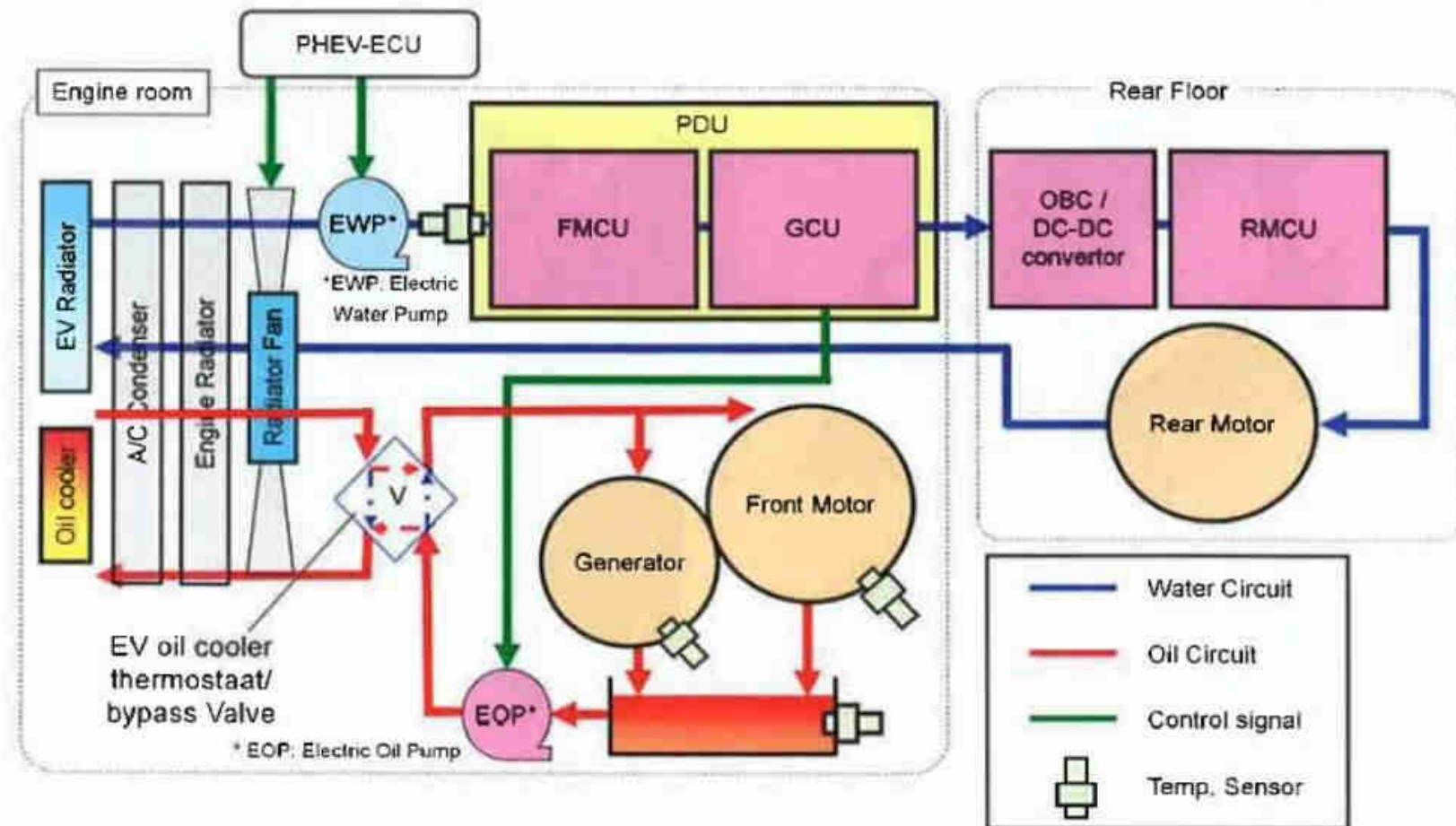
The Mitsubishi Outlander PHEV has been chosen as a suitable technology vehicle to enhance the company fleet and image in the field and to provide learnings for the GELCOservices team in regard to Plug in Hybrid Electric Vehicles.

# Data Acquisition

By using strict operational records and access to the PHEV on-board data capture we have been able to extract and analyse a number of operational aspects of the PHEV in “real time” types of use.

- Cooling coefficients of generator and front drive motor
- Regeneration use data
- Air-conditioning use data
- Power use data
- Recharge data
- Overall fuel consumptions

# Generator & Drive motors Cooling System



# Cooling Coefficients

- The on-board energy generator is cooled via an oil cooler pump and heat exchanger.
- The front drive motor utilises the same cooling circuit
- At outside ambient of 25<sup>0</sup>C it was noted the highest recorded heat exchanger temperature was 44<sup>0</sup>C.
- The differential in temperatures gives the generator and front electric drive motor a sufficient variance to ensure cooling via radiation at vehicle rest, and enhanced cooling when ram air is passed through the front mounted heat exchanger.

# EV Use Display

- Typical screen shot of Driver EV use. Note fossil fuel consumption is 0.0 L/100Km





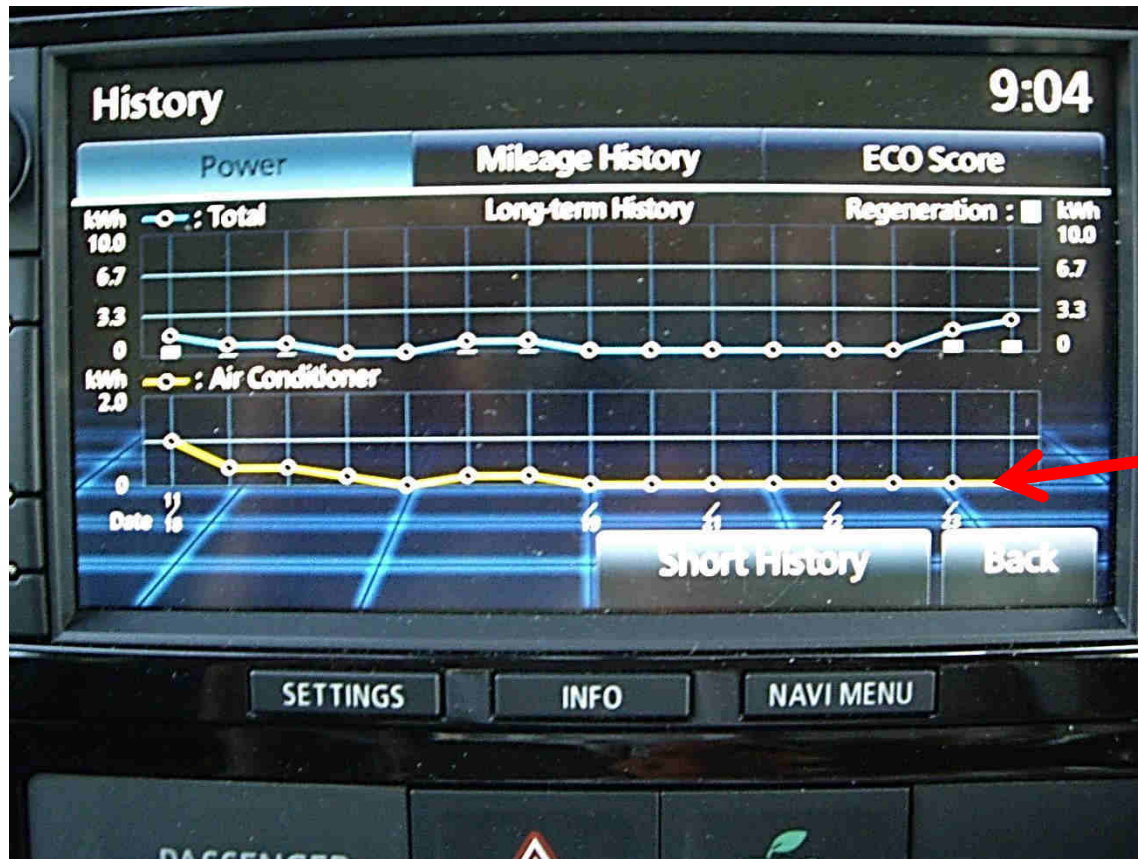
# Regeneration Use Data

- Typical driver use of regen paddles shows highs around 0.3kWh generated.



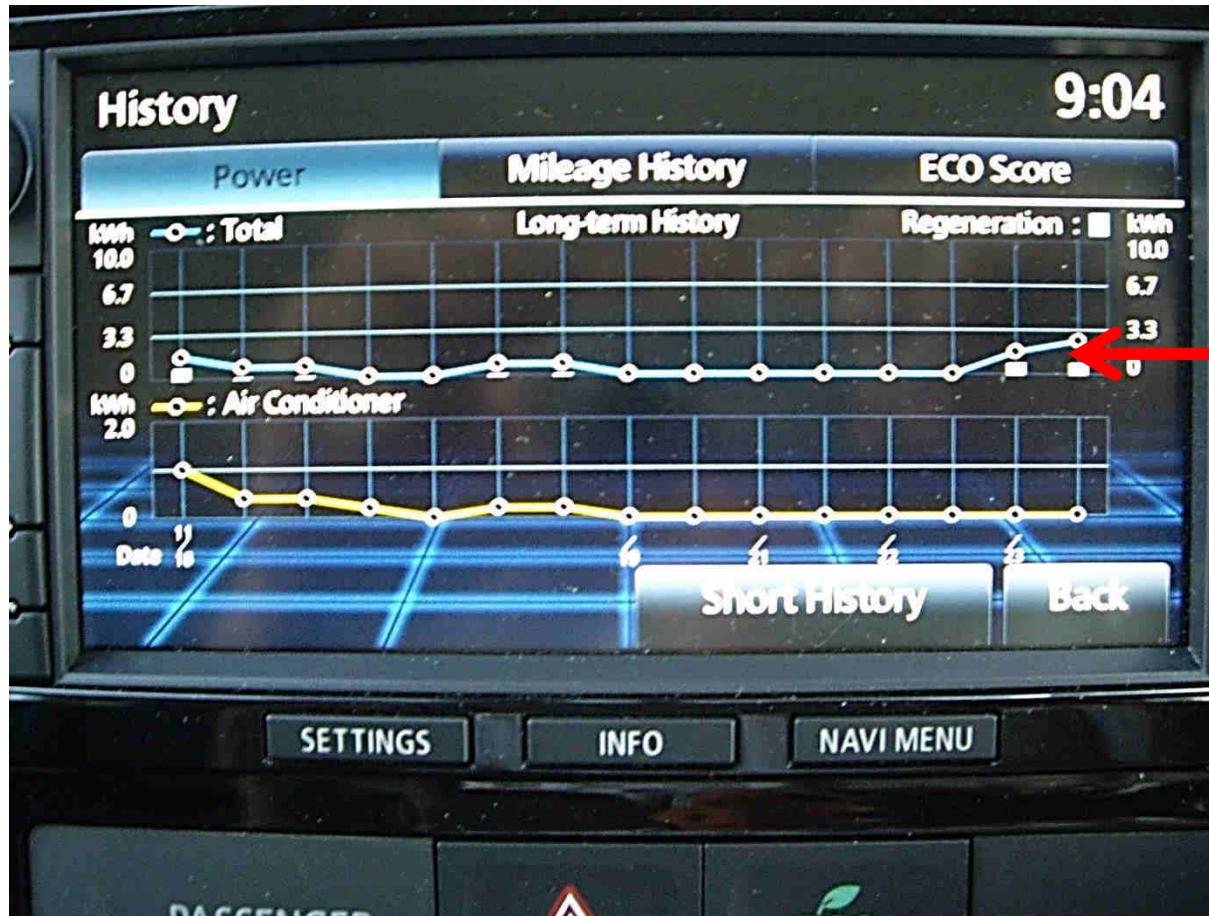


# Air-Conditioning use Data



Aircon. use for this driver is minimal – has a positive effect on energy consumption.

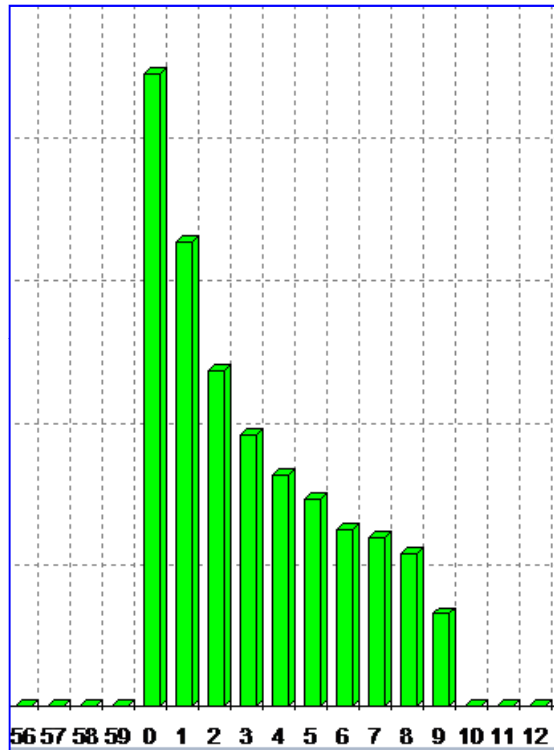
# Power Use Data



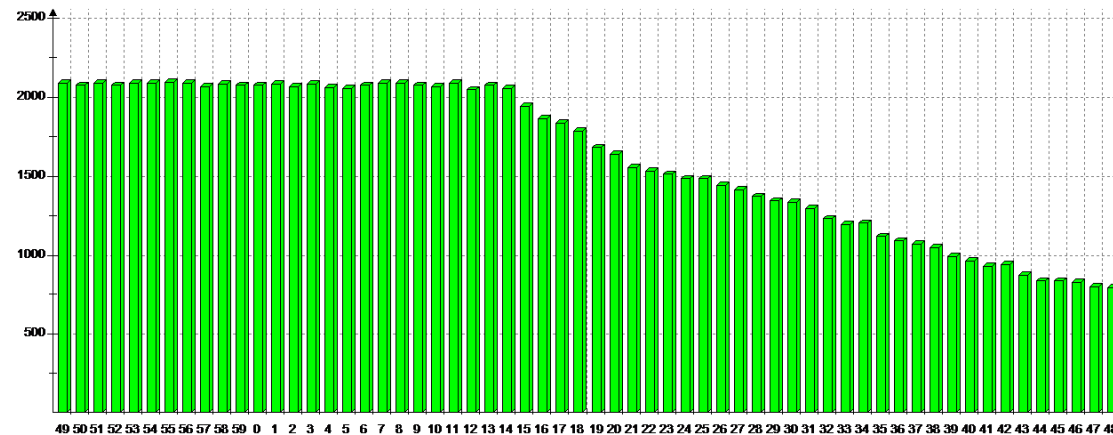
Overall Power use - long term history is less than 3.0kWh

# Recharge Data

The charts show the charge profile of a Level 2 EVSE with modulated charge controls.



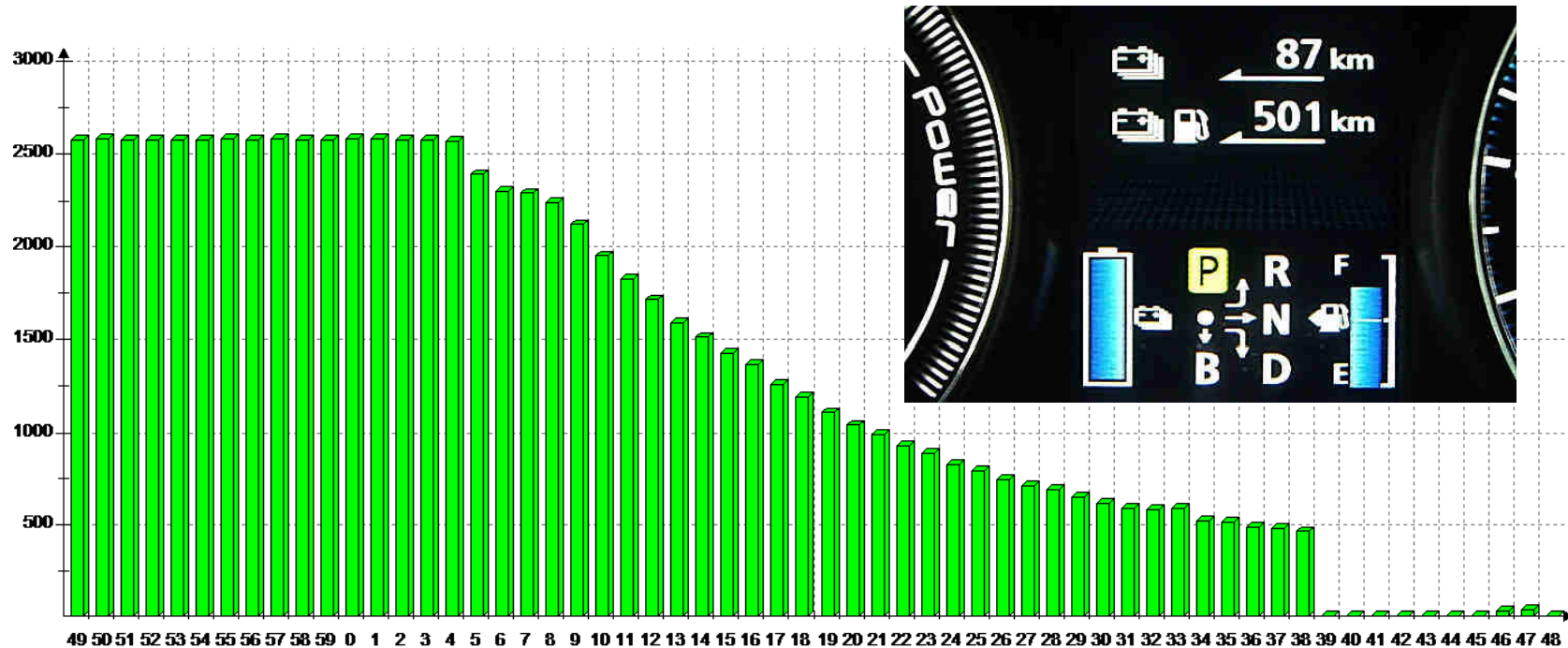
**Short duration EVSE**  
charge – 9,579Watts –  
0.95kWh in just 9.0mins



**Medium duration EVSE**  
charge – from 40%SOC –  
to 90% in just 47.0mins

# Recharge Data

The charts show the charge profile of a Level 2 EVSE with modulated charge controls.



**Long duration** EVSE charge – from 10%SOC – to 100% in just 149mins. Drive distance went from 5klm to 87klm after charge from AeroVironment EVSE-RS model

# Overall Consumptions Data

- Longest EV only drive – 71Klm
- Using Regen paddles between 3-5 settings
- Best recharge travel distance – 87Klm
- Recharge 2.5hrs – 90% Wh capacity increase using a Level 2 EVSE *from AeroVironment*
- Noted highest energy transfer was 3.9kW – 16.25A
- Typically in city & hills driving, when the ICE is engaged we record fuel consumption readings in the 1.8-1.9L/100Klm. First fill at 1750klm