

# On Grid Storage in Waitati





Total system capacity 6.5kW

2.25kW  
Solar  
Inverter



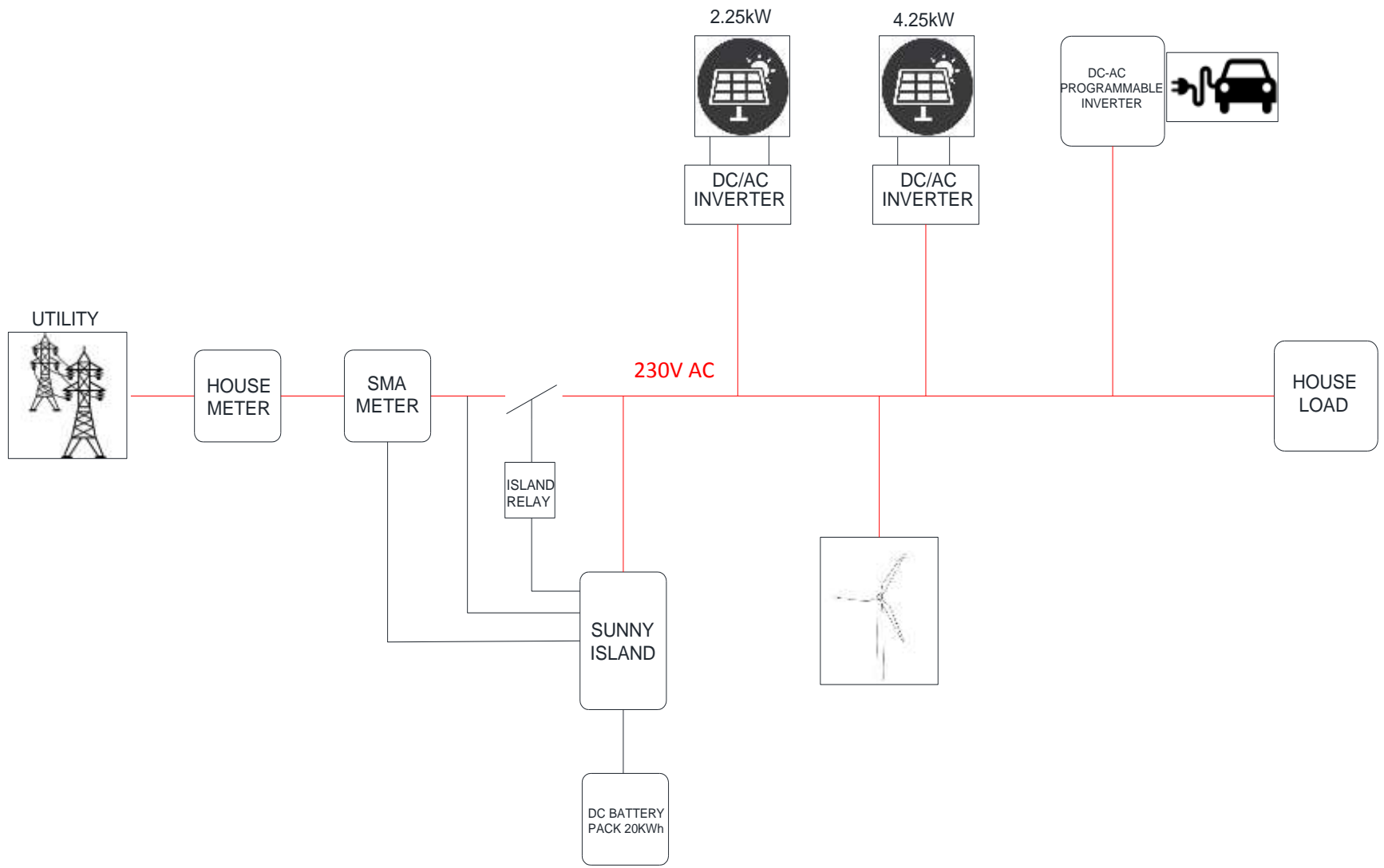
Car  
Battery  
to grid  
inverter



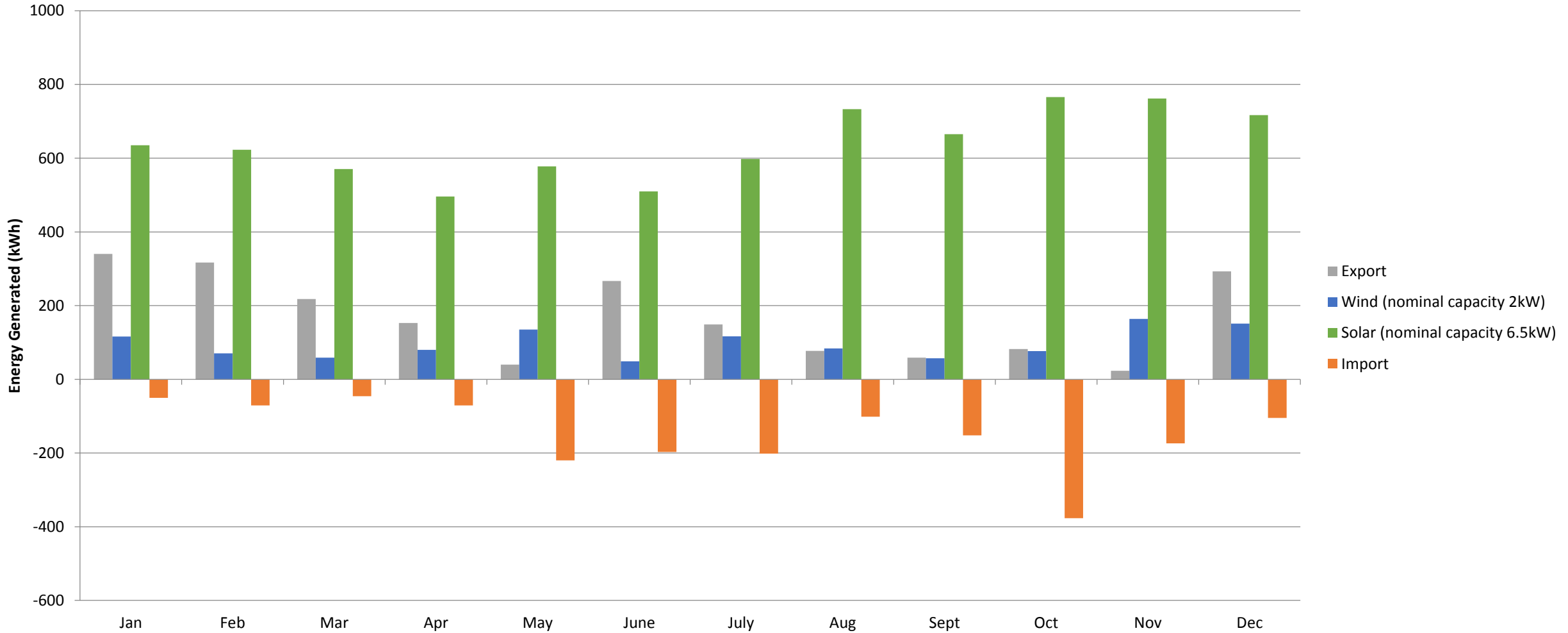
4kW  
Solar  
Inverter



Bi-directional  
inverter &  
20kWh  
battery bank



# Annual Energy Yield Hargie-pouri Power Scheme





# Annual Energy Summary

|                        |          |
|------------------------|----------|
| Solar Power Generation | 7653 kWh |
| Wind Power Generation  | 1158 kWh |
| Imported Power         | 1776 kWh |
| Total Power Exported   | 2017 kWh |

# Yearly Cost Analysis

| <b>Costings</b>                        | <b>Cost kWh</b> | <b>Power exported</b>       | <b>Revenue</b> |
|--|-----------------|-----------------------------|----------------|
| Feed in tariff                         | \$0.07          | 2017 kWh                    | \$141.19       |
| Total Solar Generated - Power Exported | \$0.43          | 5636 kWh                    | \$2,423.48     |
|  |                 |                             |                |
| Maintenance                            |                 |                             | -\$100.00      |
|  |                 |                             |                |
|  |                 | Total                       | \$2,464.67     |
|  |                 | Plant Capital (incl GST)    | \$33,000       |
|  |                 |                             |                |
|  |                 | <u>Return on investment</u> | 7.47%          |



220,000L of water – 60kWh of storage



# EV's



## Honda Insight 1999

Battery – 21KWh LiFePo4  
Voltage – 150V  
Curb Weight – 860kg  
Drivetrain – 65KW AC Induction  
Nominal Range – 160km  
Km driven – 20,00km  
Battery capacity ≈ 100%  
Converted – November 2015



## Toyota Rav4 1994

Battery – 28KWh LiFePo4  
Voltage – 330V  
Curb Weight – 1300kg  
Drivetrain – 71KW, 400Nm, Direct Drive  
Permanent Magnet  
Nominal Range – 140km  
Km driven – 62,00km  
Battery capacity ≈ 97%  
Converted – April 2012

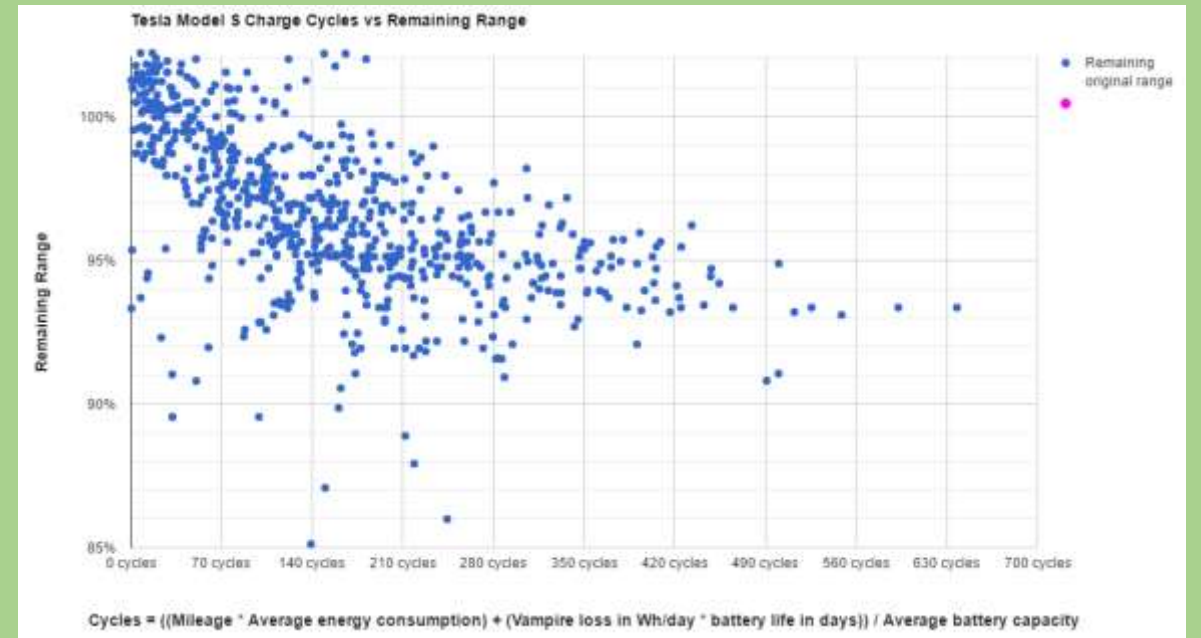
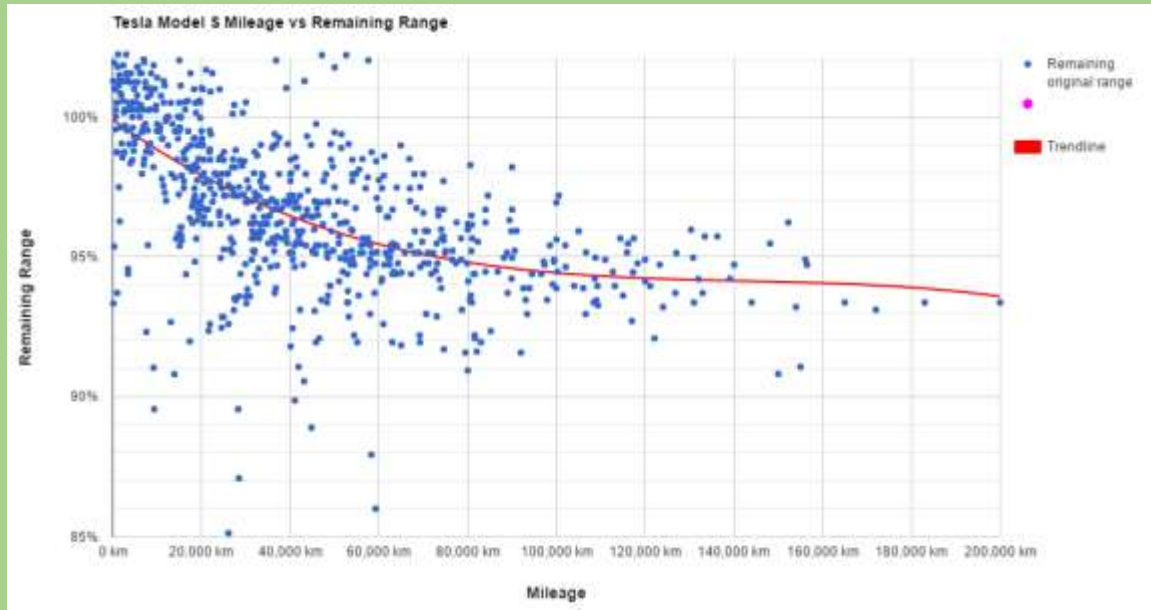


## Kermit

Battery – 33KWh LiFePo4  
Curb Weight – 960kg  
Drivetrain – 65KW AC Induction  
Nominal Range – 260km  
Km driven – 20,00km  
Battery capacity ≈ 100%  
Heating - Reverse Cycle Heat Pump  
Converted – November 2014

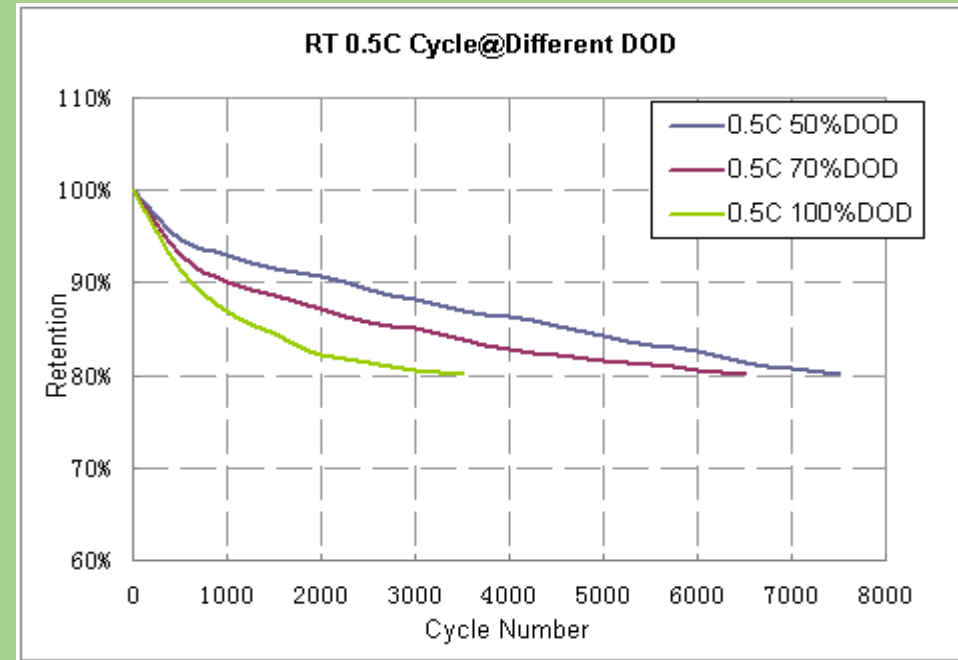
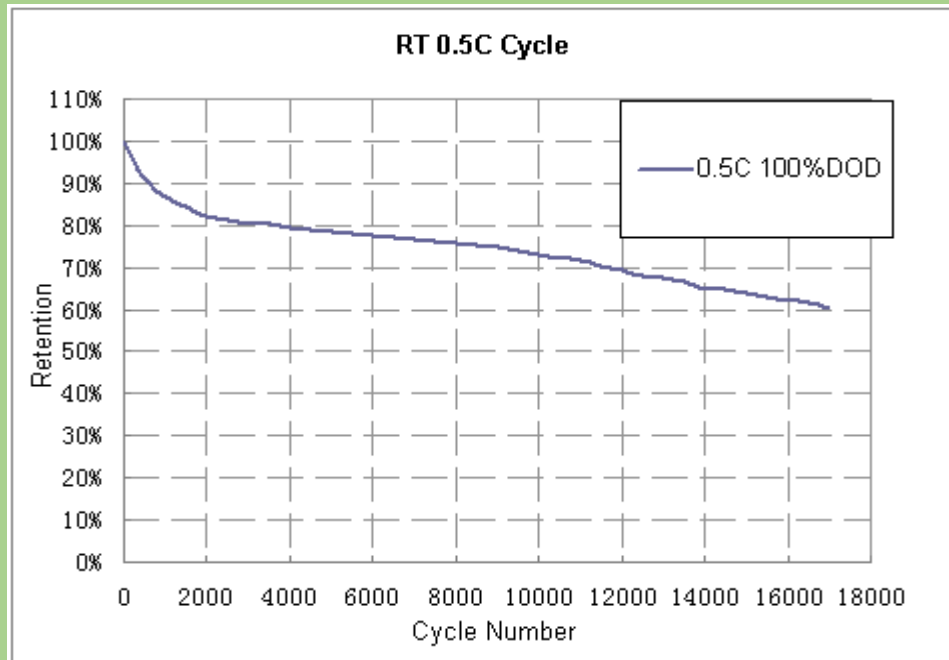


# Tesla 18650 Battery Life



<https://electrek.co/2016/11/01/tesla-battery-degradation/>

# CALB CAM72 Cycle Life





# Fast Charging vs On-board Charging



## DC Fast Charge Effects on Battery Life and Performance Study

Four model year 2012 Nissan Leaf battery electric vehicles were instrumented with data loggers and are being operated over a fixed on-road test cycle. Each vehicle is charged twice daily, with two vehicles charged at AC Level 2 (L2), and two DC fast charged (DCFC) with a 50kW charger. The traction battery packs are removed and tested when the vehicles were new, and at 10,000 mile intervals. Battery tests include constant current discharge capacity, electric vehicle power characterization, and low peak power tests<sup>1</sup>. The testing was halted at 63,000 miles. The first two pages of this fact sheet summarize the measured changes in capacity at 10,20,30,40, and 50 thousand miles relative to baseline test results. Final testing completed at 62,000 miles is presented on page 3.

|                       | 1011 L2 | 4582 L2 | 2183 DCFC | 2078 DCFC |
|-----------------------|---------|---------|-----------|-----------|
| <b>Baseline (New)</b> | 23.31   | 23.59   | 23.38     | 23.24     |
| <b>10,000 Miles</b>   | 21.75   | 22.3    | 21.97     | 21.93     |
| <b>20,000 Miles</b>   | 21.53   | 21.51   | 21.64     | 21.07     |
| <b>30,000 Miles</b>   | 19.99   | 20.2    | 19.42     | 19.33     |
| <b>40,000 Miles</b>   | 18.10   | 18.34   | 17.53     | 17.37     |
| <b>50,000 Miles</b>   | 17.51   | 17.77   | 16.94     | 16.92     |

Table 1 - C<sub>3</sub> Energy capacity<sup>2</sup> (kWh)





CALS  
3.25V  
40  
未定