

Renault Zoe Range Test

Date

Sunday 16th July 2017

Aim

The primary purpose was to determine the realistic driving of the Renault Zoe ZE40 in Northland conditions in the rural environment. The secondary purpose was to observe the various low battery warning and the vehicle’s behaviour as it runs out of electricity. The range test for urban driving will be the subject of further tests.

Test Methodology & Driving Route

The method was to conduct a drive ending in a location that is both safe to “run out” and there is ability to re-charge the vehicles. For a “run out” test with one or two vehicles is to use an existing charging station as the “run out” destination. Marsden cove was selected and as being close to Whangarei reduced the time need to re-charge enough to return to Whangarei. Two Renault Zoe were run as there were two vehicles available and there were there were enough volunteers to have a drivers and co-driver in each vehicle. One Zoe was run in “ECO” and one in “Drive” mode.

The drive start with both vehicles fully charged from Northpower’s Alexander St charging station. The driving route was SH14 to Dargaville, SH12 & SH 1 to Kaiwaka, then to Waipu via Mangawhai. From Waipu to Marsden Cove via SH1 & SH15A, with drives around Marsden Cove – Ruakaka area until re-entered the planned “run out” area in Marsden Cove.

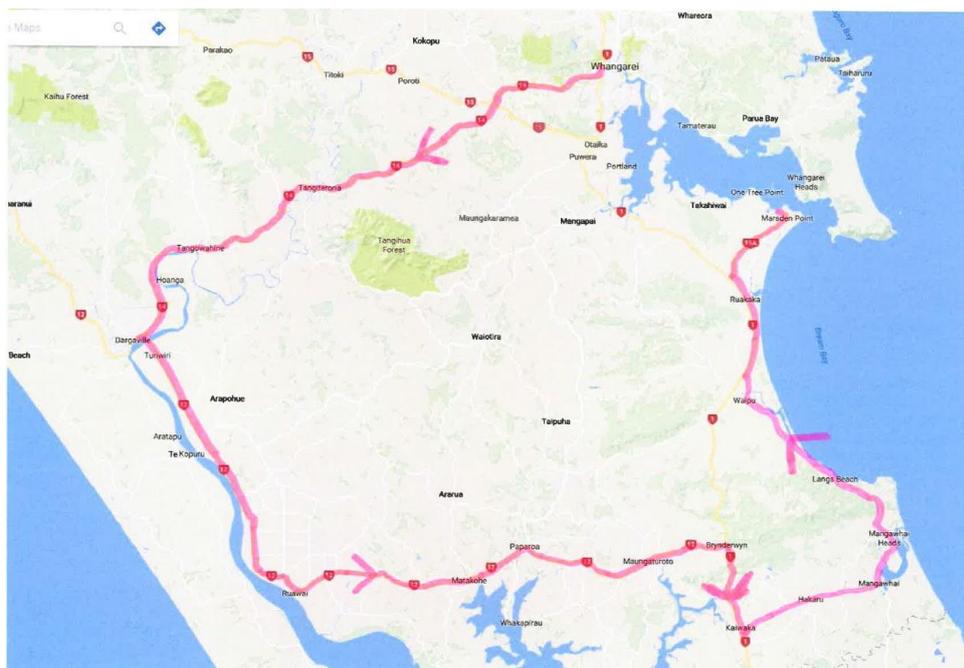


Figure 1: Driving Route

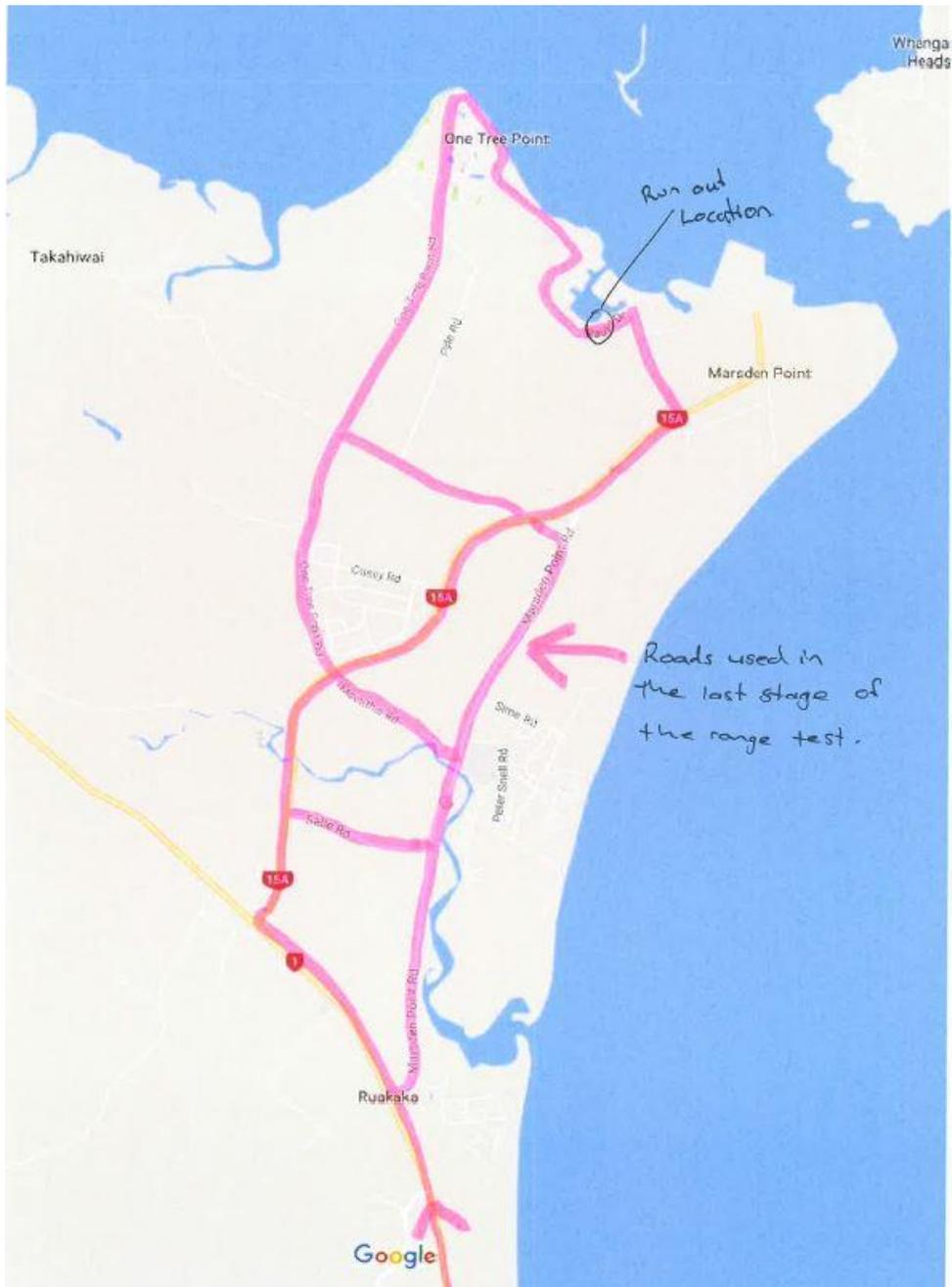


Figure 2: Roads use in the last leg of the “run out” test



Figure 3: The Test Team

Test Conditions

The weather was fine for the entire test and roads dry. The outside air temperature was 8°C at the start of the test and the day warming up to around 17°C when the test concluded in mid-afternoon. There was no traffic congestion or significant road works on the driving route. As the day was fine neither the air conditioning or heating was not used.

Driving Observations – Pre “Run Out” Legs

Leg	Range Est (km)		Distance (km)		Av speed (km /h)		Efficiency (km/kWh)	
	KSB 585	KSB 586	KSB 585	KSB 586	KSB 585	KSB 586	KSB 585	KSB 586
Start	286	290	-	-	-	-	-	-
Alex St - Dargaville	189	197	56.1	56.8	67	60	5.88*	5.49*
Dargaville - Kaiwaka	100	94	76.1	79.1	77	74	5.85*	5.65*
Kaiwaka - Waipu	84	76	38	37.9	53	52	7.41*	7.19*

Typical rural drives efficiency of other electrical vehicles

Nissan Leaf: 6.4 – 6.8# (3 Leafs Whangarei – Waipu Cove return trip)

VW e-Golf: 7.4* km/kWh (Whangarei – Langs Beach Return)

Hyundai IONIQ: 7.8* km/kWh (Whangarei – Kerikeri return trip)

*From dash board instrumentation (not measured)

Measure i.e. calculated from the energy required to re-charge



Figure 4: Driver Change at the Dargaville Charging Station (no charge taken there)

Results – Run Out Test

Warning	Trip Distance (km)		Range Estimation (km)	
	KSB 585	KSB 586	KSB 585	KSB 586
Battery light (warning to “consider ECO process”)	227.8*	228.9	20	20
Audible “beeping” & battery light flashing	235.0	234.7	13	13
Range estimation “blanks out”	239.5	239.5	9	9
“limited performance” warning	248.5	249.2	blanked out	blanked out
Significant drop on power	269.4	didn’t record	Blanked out	Blanked out
Stopped	272.6	268.0	Blanked out	Blanked out

Run out summary table

*KSB 585 was running in “ECO” mode so the warning notice to consider “ECO” mode didn’t appear

Limited Power Mode

The vehicles could still reach a speed of 75 km/h on a flat road but and very little acceleration, the loss in power very noticeable. About 3 km before coming to a complete stop there was a second and very noticeable drop in power and the maximum dropped to around 40 km/h. From that point the vehicles just went slower and slower until they stopped.



Figure 5: Zoe display showing battery warning lamp, “limit performance” warning and range blanked out



Figure 6: Final push to the charging station



Figure 7: Both Zoe's Run – Out and pushed to the Charging Station

Conclusions

There was no practical difference in range between the two vehicles even though one was running in “ECO” mode and the other in “Drive”. We driving in ECO the maximum power available are less the “Drive” mode and the speed limited to around 95 km/h. A possible reason is that there were few locations on the route where the vehicle running in “Drive” mode could maintain 100 km/h and therefore both vehicle were running at very similar speeds and therefore the driving efficiency would be practically the same.

The “practical” range in these conditions is about 250 km; “practical” range is taken to the point where the vehicle performance becomes limited. The Zoe ZE 40 seems to be able to travel approximately 20 km in limited performance mode with the last 2- 3 km being in what can be described as a “turtle” mode. Unlike some electric vehicles the Zoe seems to have a “soft turtle” mode i.e. it goes slower and slower until it stops.

The range estimation from the first low battery warning seemed to be reasonable accurate in predicting the point to “limited” performance in the final leg of the drive. It is most likely that vehicle's computer is set to predict the range to this point not the final stopping point.

Russell Watson

17th July 2017