

# AZD AZURE DYNAMICS ELECTRIC TRANSIT CONNECT vs DIESEL FORD TRANSIT 1.8TDCI CONNECT.

## 1. Introduction

- 1.1. The purpose of this was to evaluate the current diesel model against the latest electric equivalent
- 1.2. The vehicle to be tested was the Ford Transit Connect Electric AZD on a standard courier route over a planned working week.
- 1.3. The driver operator was inducted in how the electric vehicle works including the location of its charge point which is located under the vehicles filler cap. The vehicle was to be charged overnight in the Transport Workshops in Purfleet through the standard adapter lead provided to receive 220v -240v charge.

## 2. Background and Specifications

The Transit AZD Connect was selected against the standard Diesel Connect because they were comparable size and the controls were familiar with our driver. The loading and unloading was also identical to ascertain what the true range of a electric vehicle was in a live working environment instead of what is quoted by the manufacturer in perfect test conditions. In this case the vehicle manufacturer had a quoted operational range of 80 miles.

The vehicle was trialled and tested on the Passenger Travel Courier routes dealing with various pick ups and drop offs around the borough in the month of September 2011. The length of the route is 80 miles which was the range of the Electric AZD.

### Specification for Electric Vehicle

- The Vehicle is powered by a High Voltage Liquid cooled 28 kwh Lithium - ion battery pack.
- Equipped with a on board charger receiving AC input from a charge port .Converts AC to DC power to charge the battery in 6 – 10 hours depending on amperage.
- Vehicle is driven by a motor controller which converts DC to AC for the two Electric Traction Wheel Motors which in turn converts the energy into Torque to drive the front wheels of the vehicle.
- Vehicle capable through re-gen braking and coasting of extending battery range through the Motor Controller inverter.
- Capable of carrying a pay load 500 kgs with a Gross Vehicle Mass of 2340 kgs
- Full European type approval.
- Fully tested as an Electric Vehicle.
- Purchase Price £39,995

## Specification of Standard Ford Transit Connect SWB Diesel

- Powered by a 1.8 TDCI 66kw (90ps) Single Overhead Camshaft Engine with Direct injection.
- High pressure common rail multipoint fuel injection system and fixed geometry turbo charger with intercooler.
- Vapour Diesel Particulate Filter.
- 5 Speed manual transmission.
- 60 litre fuel tank.
- Capable of carrying 829 kgs with a gross vehicle mass of 2340 kgs.
- ESP electronic stability control & ABS anti lock braking system.
- Purchase price of a New Havering specification Connect van based on current prices £12,856 ( Original purchase price of current connects on PTS fleet £8,970)

### **3. Real Time Testing (Trial)**

The object of this was to place the fully charged electric vehicle with one of our selected, briefed and trained courier drivers on standard red / yellow morning routes and then in the afternoon proceed with blue / green routes carrying out their normal day to day tasks, which is normally carried out by a standard diesel transit connect.

7.00am 12.09.11

Driver takes vehicle from Purfleet and starts red / yellow routes which cover collections from Royal Mail Crow Lane to drop off and collection points at the Town Hall, Harrow Lodge Depot and various schools and locations around the borough approx 40 miles.

11.15am

Vehicle returned to Purfleet with battery health 98% exhausted. With the vehicle unable to complete its afternoon run the vehicle is returned to the Transport Workshop and placed back on charge at approx 11.30am with the courier service reverting back to their standard diesel connect van to complete the afternoon blue / green routes. Electric vehicle checked over after being on charge for 19 hours vehicle is now again in a fully charged state on 13.09.11

7.00am 13.09.11

Vehicle again proceeds with the same driver on courier red / yellow routes, weather conditions on the day damp. Vehicle again returned after completing mornings run.

11.15am

Yet again the vehicle is returned to the workshop with the vehicles battery range completely exhausted with only 5 miles of range left after its morning run with the driver reverting back to the diesel powered original courier van.

## **Conclusion:**

- Having extensively talked to the Ford Motor Company it would suggest that the way the electric motors deliver power to the front wheels to AZD electric connect decreases the range cycle of the vehicle considerably especially with multiple drop off and collection points and the 80 mile range quoted by the manufacturer can not be achieved.
- Ford Motor Company have agreed that the vehicles electrics may have to be re-mapped in accordance to the type of work it was placed under and linked to our drivers type of driving style under a full evaluation. But this is still only guess work by Ford and we are still currently waiting for them to offer this service.
- Considering the original purchase price of the current Ford Transit Connects is £8,970 and currently Passenger Travel Services run two identical vehicles with a total purchase price £17,940 and that the purchase of two electric connect vans would cost £79,990 this is the equivalent of purchasing 6 diesel connect vans at current prices.
- Total average fuel cost for a standard Transit Diesel Connect per year is £1900 this is based on these vehicles averaging 35.1 mpg or 7.72 miles per litre which equates to a working range of 462 miles between re – fuelling (based on their standard 60 litre tanks) So the 2 vehicles would cost £3,800 p.a or over the 4 years which they are currently based on £15,200 add this to their purchase price gives you a grand total of £33,140.
- It would cost the council an additional extra £46,850 on top of the original purchase price and fuel running costs of the 2 diesel connects to purchase 2 AZD electric connect vans that can only partially meet the requirements of the service and so at this time are unsuitable for this type of work.

## **4. The Future**

Various manufacturers will be launching electric and diesel hybrid vehicles in 2012 which we will be involved in speaking to them and potentially testing the vehicles on trial.

Below is a list of Manufactures and Models

- Citroen – C Zero
- Ford – Electric Focus
- Mitsubishi – I Miev
- Nissan - Leaf
- Renault – Zoe, Twizy, Kangoo Z.E & Fluence Z.E (expecting trial vehicles in Feb / March)