APSE

National Transport &

Vehicle Maintenance Group

NORMAN HARDING

CORPORATE FLEET MANAGER

LONDON BOROUGH OF HACKNEY

HISTORY 1998 TO 2024

PAST

- BEV
- FAME BIODIESEL

PRESENT

- HVO

FUTURE

- HVO
- ELECTRICITY

Hackney

TFL SUBURBAN + FREEFLOW CYCLE DIESEL
EMISSIONS TEST SUMMARY SHEET

MILLBROOK

Customer:	Transport for London				
Customer Address:	11th Floor G6 Palestra, 197 Blackfriars Road, Southwark, London				
Test Purpose:	TFL Fuel Comparison testing				
Vehicle No:	*VU66 NLX*	Site No. 2	DYNAMOMETER SETTINGS		
Vehicle Type:	*Dennis Eagle Elite 6*		INERTIA	14044 kg	
Engine:	*Euro 6*		F°	323.57 N	
Transmission:	*Auto*		F¹	-3.9970 N/kmh	
Fuel Type:	*Pump Diesel*		F²	0.28160 N/kmh²	
Fuel Batch No:	*N/A*		F³	-0.0002600 N/kmh³	
Millbrook Project No:	*PT0034-093-01*				

Test No. *ML02016197*	*09-Jan-17*						Fuel Cons
Odo 3251	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.000	0.082	0.681	1225.8	N/A	46.29
Phase 2	g/km	0.002	0.012	0.323	958.5	N/A	36.20
Phase 3	g/km	0.000	0.012	0.053	729.5	N/A	27.55
Combined Result	**g/km**	**0.001**	**0.024**	**0.252**	**891.5**	**0.0076**	**33.67**
					PN/Km	*1.36E+11*	

Test No. *ML02016198*	*09-Jan-17*						Fuel Cons
Odo 3281	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.001	0.025	0.994	1248.8	N/A	47.16
Phase 2	g/km	0.000	0.010	0.212	954.8	N/A	36.06
Phase 3	g/km	0.000	0.013	0.037	708.8	N/A	26.77
Combined Result	**g/km**	**0.000**	**0.014**	**0.261**	**883.4**	**0.0050**	**33.36**
					PN/Km	*5.45E+10*	

Test No. *ML02016199*	*09-Jan-17*						Fuel Cons
Odo 3333	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.000	0.030	0.648	1216.6	N/A	45.94
Phase 2	g/km	0.000	0.009	0.222	930.9	N/A	35.15
Phase 3	g/km	0.000	0.007	0.029	699.0	N/A	26.40
Combined Result	**g/km**	**0.000**	**0.012**	**0.200**	**864.7**	**0.0046**	**32.65**
					PN/Km	*5.23E+10*	

Average of Combined Tests (g/km)	**0.000**	**0.017**	**0.238**	**879.9**	**0.006**	**33.23**
Standard Deviation/Mean x100	**106.61**	**31.93**	**11.40**	**1.28**	**23.48**	**1.28**

Comments:

Compiling Engineer: Date: 11/01/17

Approving Engineer: Date:13/01/17

TFL SUBURBAN + FREEFLOW CYCLE DIESEL
EMISSIONS TEST SUMMARY SHEET

MILLBROOK

Customer:	Transport for London				
Customer Address:	11th Floor G6 Palestra, 197 Blackfriars Road, Southwark, London				
Test Purpose:	TFL Fuel Comparison testing				
Vehicle No:	*VU66 NLX*	Site No. 2	DYNAMOMETER SETTINGS		
Vehicle Type:	*Dennis Eagle Elite 6*		INERTIA	14044 kg	
Engine:	*Euro 6*		F°	323.57 N	
Transmission:	*Auto*		F¹	-3.9970 N/kmh	
Fuel Type:	*HVO (Biodiesel)*		F²	0.28160 N/kmh²	
Fuel Batch No:	*Customer supplied*		F³	-0.0002600 N/kmh³	
Millbrook Project No:	*PT0034-093-01*				

Test No. *ML02016200*	*10-Jan-17*						Fuel Cons
Odo 3412	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.014	0.029	0.291	1120.5	N/A	42.32
Phase 2	g/km	0.002	0.014	0.105	843.9	N/A	31.87
Phase 3	g/km	0.000	0.017	0.017	628.5	N/A	23.73
Combined Result	**g/km**	**0.003**	**0.018**	**0.094**	**785.7**	**0.0048**	**29.67**
					PN/Km	*4.46E+10*	

Test No. *ML02016201*	*10-Jan-17*						Fuel Cons
Odo 3476	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.008	0.022	0.111	1110.7	N/A	41.95
Phase 2	g/km	0.001	0.013	0.100	839.3	N/A	31.69
Phase 3	g/km	0.000	0.007	0.015	616.7	N/A	23.29
Combined Result	**g/km**	**0.002**	**0.012**	**0.059**	**776.3**	**0.0037**	**29.32**
					PN/Km	*6.01E+10*	

Test No. *ML02016202*	*10-Jan-17*						Fuel Cons
Odo 3516	UNITS	HC	CO	NOx	CO2	PM	(Carb Bal)
Phase 1	g/km	0.006	0.030	0.120	1098.0	N/A	41.46
Phase 2	g/km	0.001	0.009	0.105	818.3	N/A	30.90
Phase 3	g/km	0.000	0.009	0.016	617.2	N/A	23.31
Combined Result	**g/km**	**0.001**	**0.013**	**0.063**	**766.6**	**0.0035**	**28.95**
					PN/Km	*5.80E+10*	

Average of Combined Tests (g/km)	**0.002**	**0.014**	**0.072**	**776.2**	**0.004**	**29.31**
Standard Deviation/Mean x100	**39.81**	**18.78**	**21.81**	**1.00**	**13.80**	**1.01**

Comments:

Compiling Engineer: Date:12/01/17

Approving Engineer: Date:13/01/17

SUMMARY OF TESTING

(g/km)	HC	CO	Nox	CO2	PM
Baseline - EN590	0	0.017	0.238	879.9	0.006
HVO	0.002	0.014	0.072	776.2	0.004
	#DIV/0!	-17.65%	-69.75%	-11.79%	-33.33%
Significant?	???	No	Yes	Yes	No

HGV TO BEV & DEPOT ELECTRIFICATION

DEPOT ENERGY COMPARISON

Figure 6. Uncontrolled EV charging demand profile

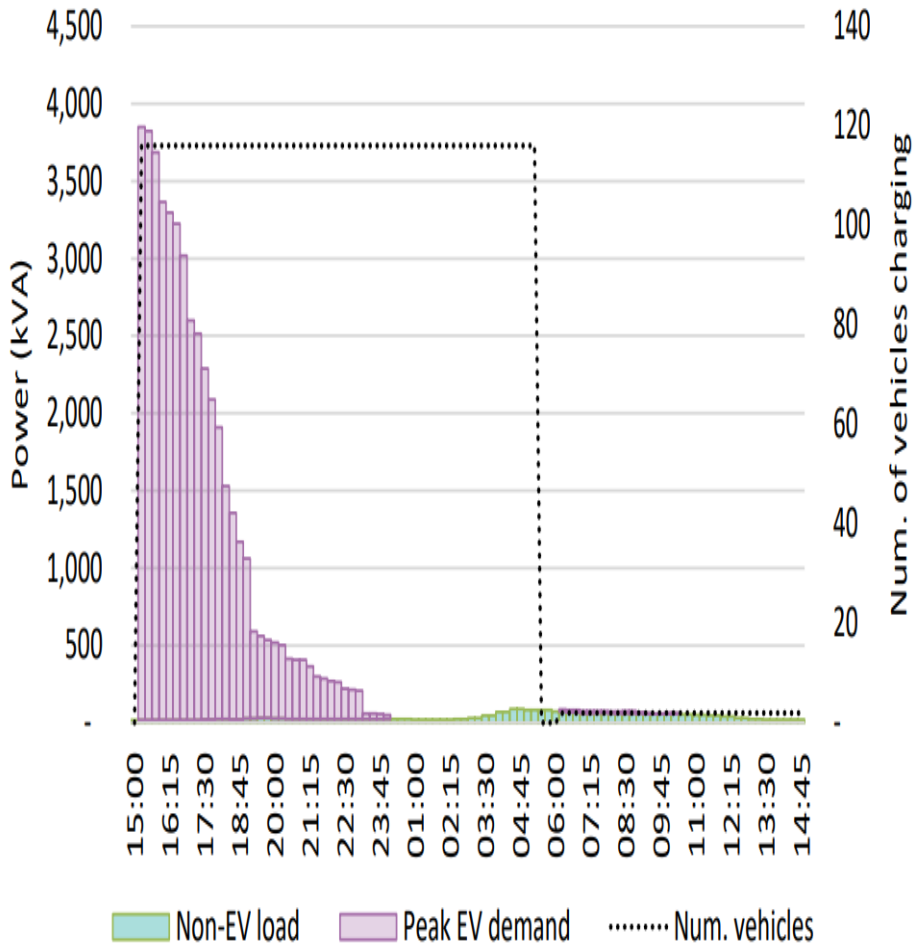
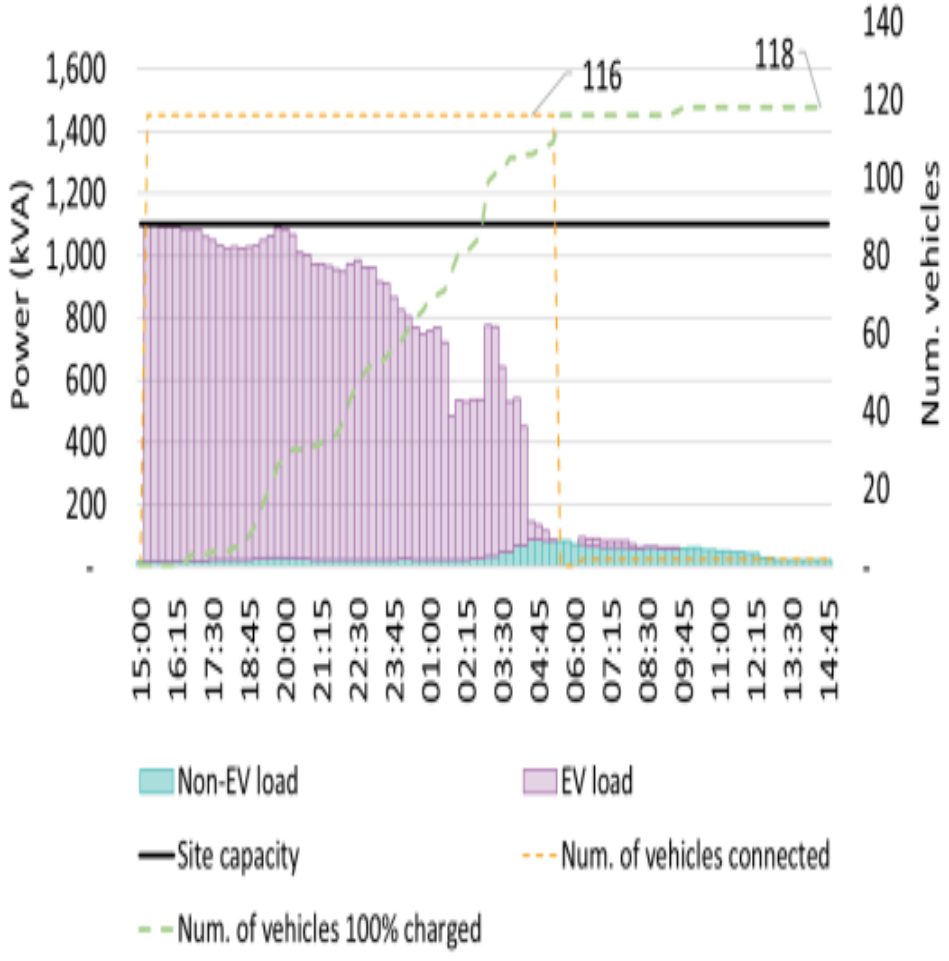


Figure 3. Daily EV charging demand profile for Scenario 3



ENERGY FROM WASTE

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PYROLYSIS

https://www.youtube.com/watch?v=cUpoe58zbWY