Low Carbon Vehicle Deployment Trials & Tribulations

Low CVP Conference

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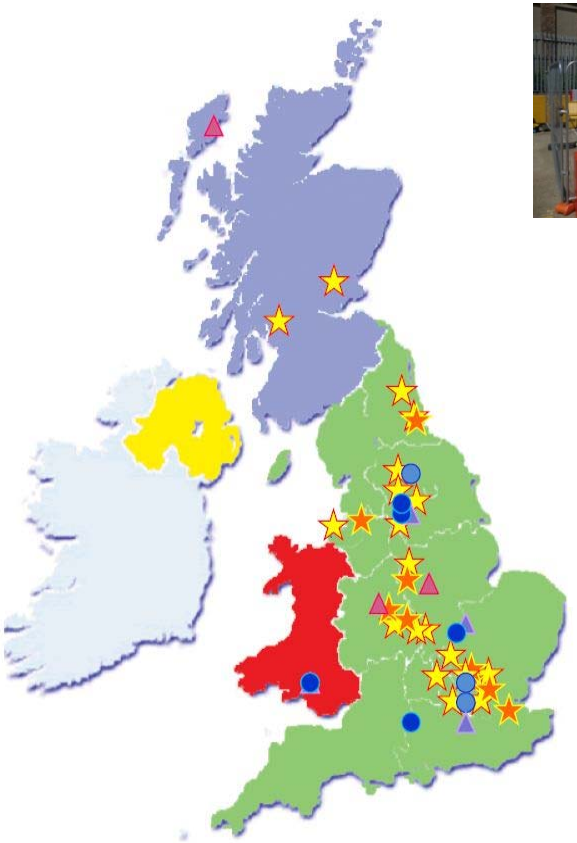
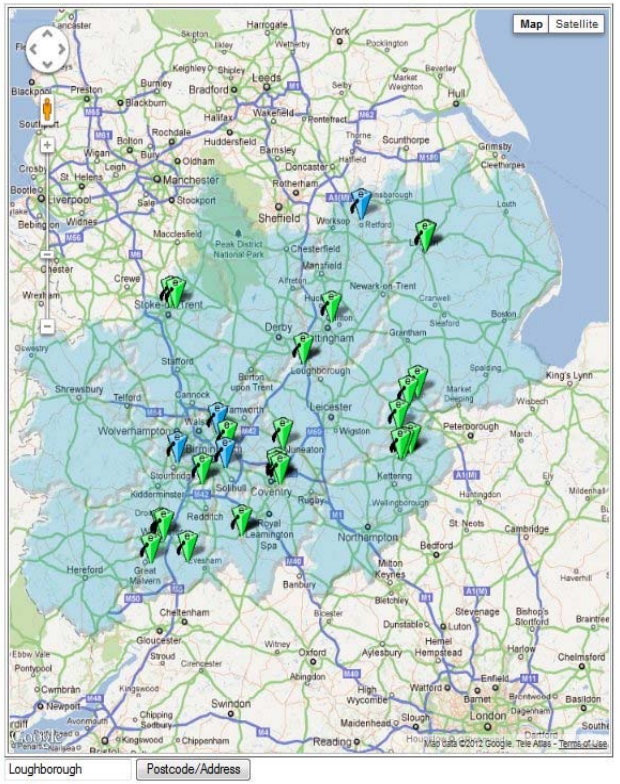
Fleet Carbon Reduction

Cenex
Centre of excellence for low carbon and fuel cell technologies

Low Carbon Vehicle Deployment

Cenex Fleet and Infrastructure Trials





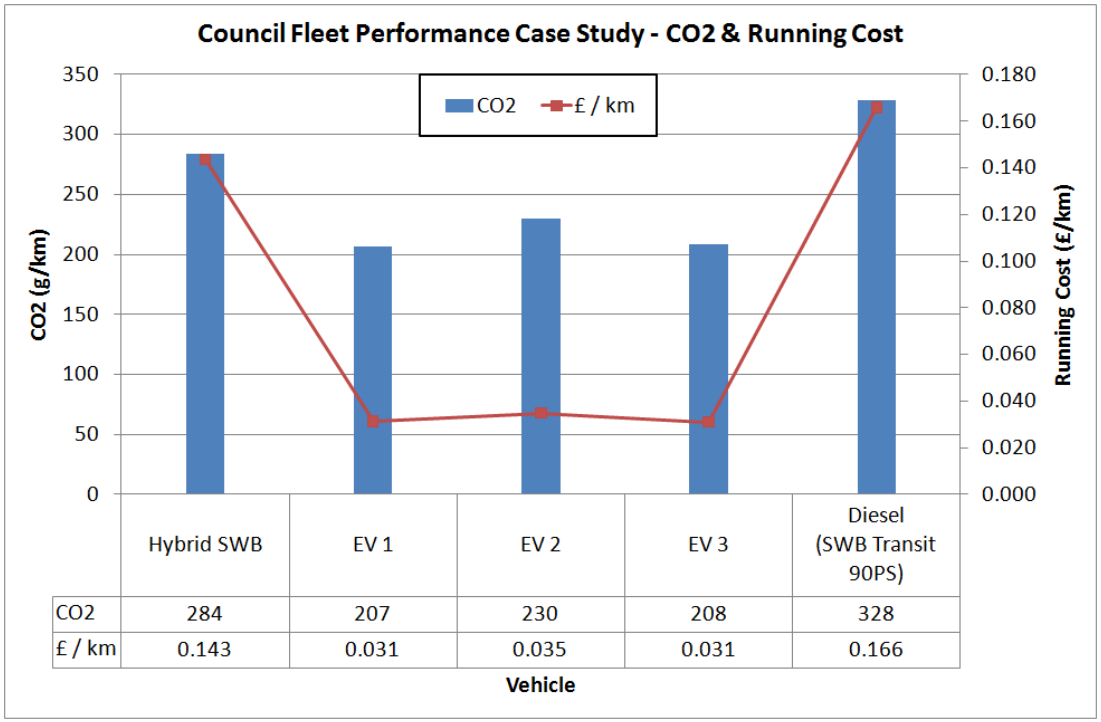
Low carbon vehicle procurement programme

- Integrates a grant scheme with a procurement framework to control the risk for the fleet operators
- Procurement framework incorporates minimum performance standards for vehicles supported by independent testing
- Real world performance data monitored through onboard telemetry

LCVPP: Council fleet operations

- Relative performance of different vehicles in similar roles across the LCVPP fleet

Vehicle type	CO2 saving	Running cost saving
Hybrid	13.5 %	13.5 %
EVs	30 % to 37 %	79 % to 81 %



- Running cost calculation based on diesel and electricity supply costs

LCVPP: Vehicle usage

- Operational characteristics of different vehicle types within the same fleet

Vehicle Type	Total Distance (km)	No. Trips	Average Trip Length (km)	Average Trip Speed (km/h)	Average Trip Duration (hrs)	Role
Hybrid	14,637	2,653	5.52	22.1	0.25	Trades Vehicle
Electric	7,237	332	21.8	12.5	1.74	Wheelie Bin Delivery

- Relative roles of the vehicles are apparent:
  - Hybrid vehicles (trades vehicles – mobile workshops) – occasionally reactive and unplanned workload, higher frequency of trips
  - EV (wheelie bin delivery) is being driven over planned routes with lower load and high cargo area requirements. Removes concerns over range and charge planning

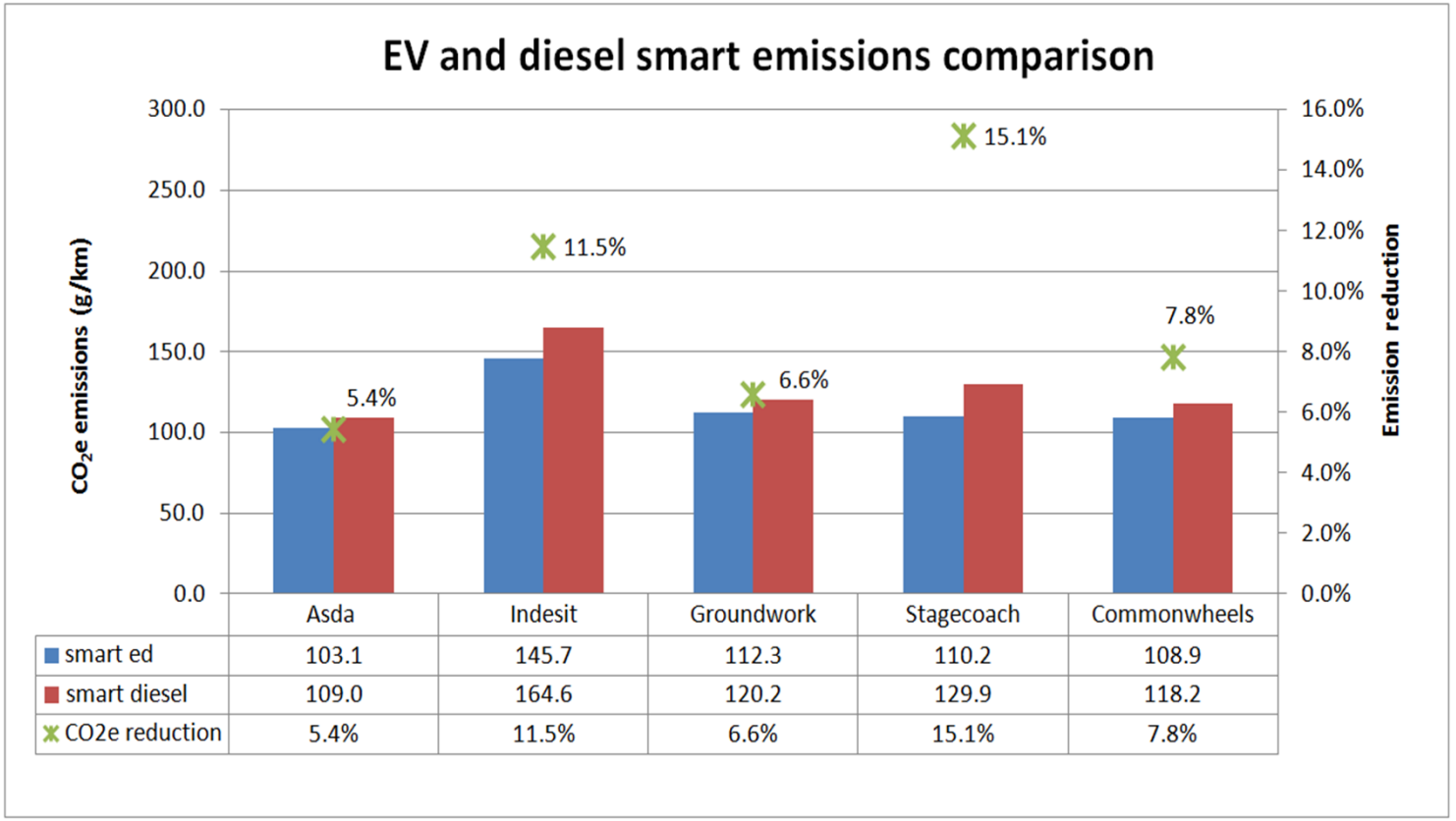
EV car fleet integration trials (Smart Moves)

- Integration of smart ed or Mitsubishi iMiEV into 12 fleets
- Between November 2010 and April 2011
  - Private sector
  - Wide mix of duties

- Examine in fleet specific context
  - Usage
  - CO_2
  - Economics
  - Fleet users reactions
  - Fleet managers reactions

Smart Moves: Emission savings

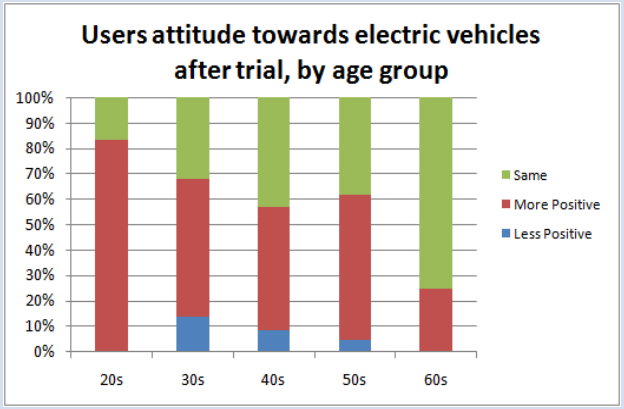
- Comparative CO_2 performance of a smart ed and smart diesel
  - Fair comparison - same drive cycle with consistent ambient conditions
  - Modelled using the Cenex Fleet Carbon Reduction Tool
    - Drive cycle generated based on real world fleet data
    - Vehicle models validated to multiple laboratory test results



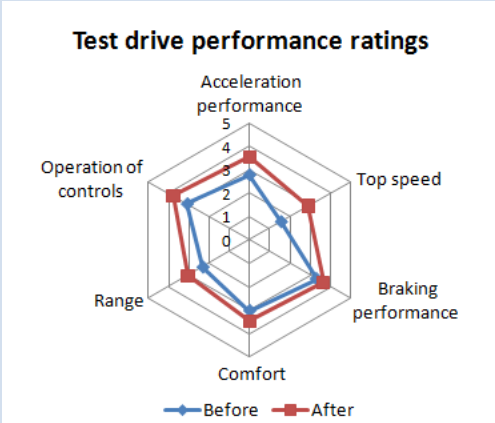
	Asda	Indesit	Groundwork	Stagecoach	Commonwheels
smart ed	103.1	145.7	112.3	110.2	108.9
smart diesel	109.0	164.6	120.2	129.9	118.2
CO2e reduction	5.4%	11.5%	6.6%	15.1%	7.8%

Smart Moves: Perceptions

Fleet Drivers



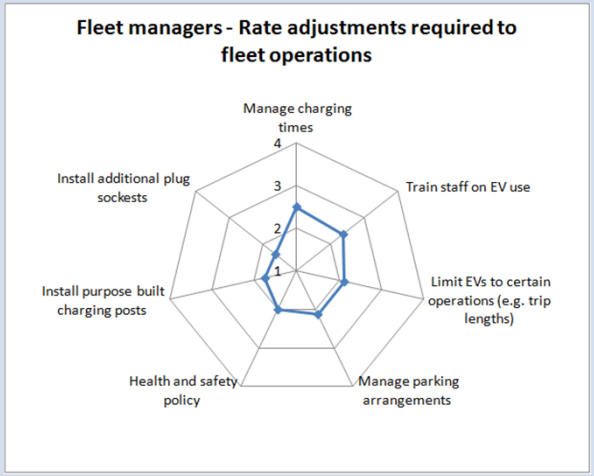
58 % of drivers felt more positive about EV's after the trial.



EVs outperformed on all criteria during test drive

Fleet Managers

Only 1 in 8 fleet managers concerned about limited public recharging infrastructure



87% of fleet managers considered limiting EVs to certain operations

Economics – results

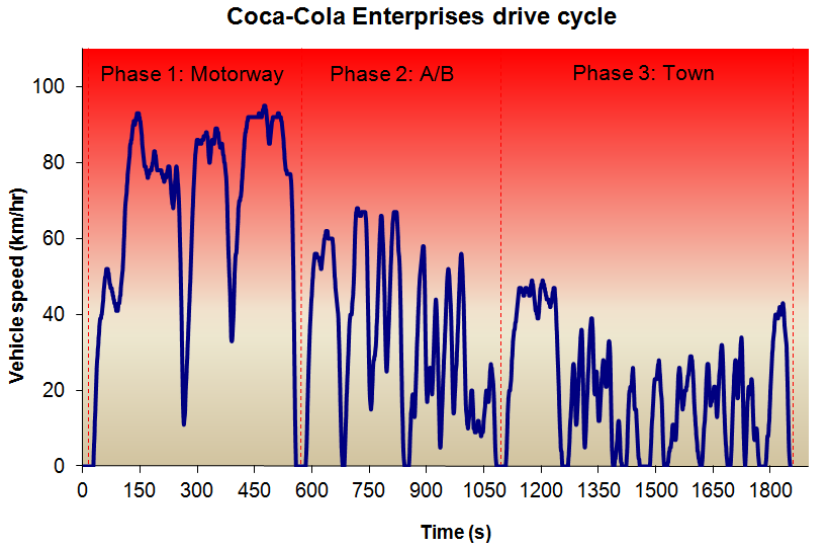
		Annual ownership cost differential (£) at current energy prices						Annual ownership cost differential (£) with linear rising energy prices					
		90% peak			90% off-peak			90% peak			90% off-peak		
	Case Study	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7
Base mileage	Groundwork	705	585	563	677	557	535	668	523	477	641	496	449
	Asda	619	482	452	570	433	403	537	345	261	488	296	211
	Indesit	599	479	457	558	438	416	523	353	280	482	311	239
	Commonwheels	528	371	332	452	295	256	396	152	25	320	76	-51
	Stagecoach	483	346	316	416	278	249	351	126	7	283	58	-60
Increased mileage	Groundwork	693	555	525	651	514	484	637	463	397	596	422	355
	Asda	552	395	357	478	322	283	429	191	70	355	117	-4
	Indesit	534	397	367	472	335	305	420	207	101	358	145	39
	Commonwheels	359	203	164	245	89	50	162	-127	-297	48	-241	-411
	Stagecoach	349	192	153	247	90	52	150	-139	-310	48	-241	-412
Stretched mileage	Groundwork	512	355	316	403	247	208	367	504	-21	259	396	-129
	Asda	444	287	248	344	188	149	278	11	-138	179	-88	-238
	Indesit	198	42	3	58	-99	-138	-60	-389	-601	-201	-530	-741
	Commonwheels	398	242	203	293	137	98	216	-62	-223	111	-167	-328
	Stagecoach	325	168	129	218	62	23	117	-178	-356	10	-285	-462

Increased annual mileage

Rising energy prices and utilisation of off-peak tariffs

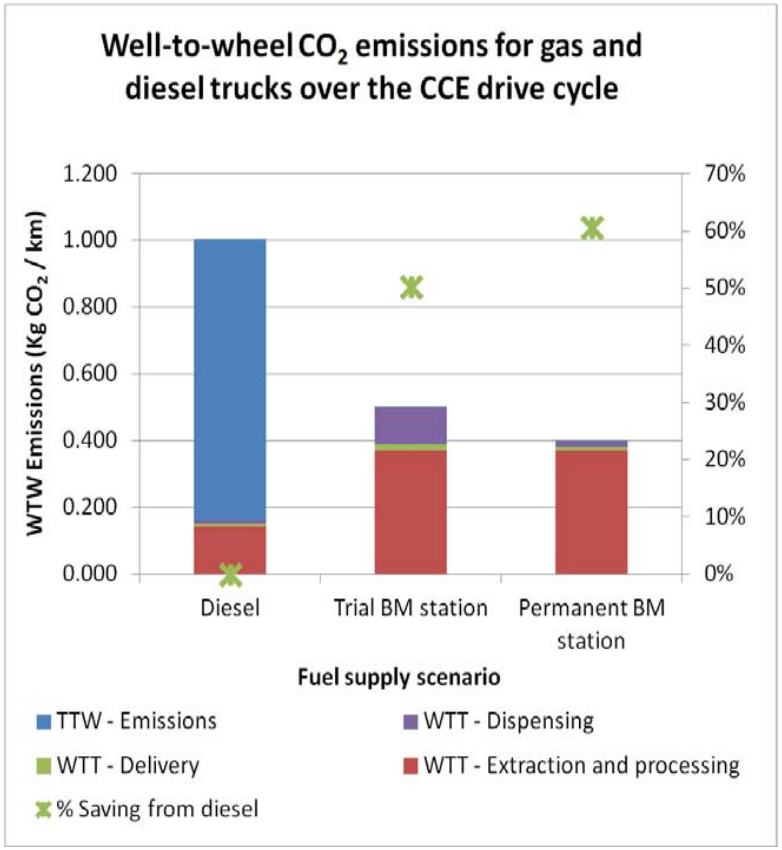
Coca Cola bio-methane trial

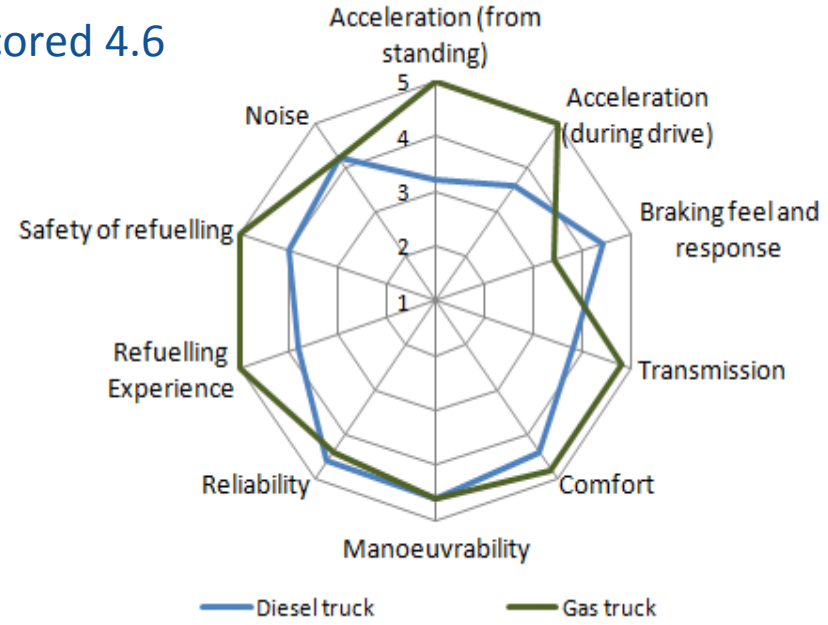
- The trial compared the performance of a diesel and a gas powered Iveco Stralis truck
- The gas vehicle had a small payload penalty of 700 kg due to the additional weight of the fuel tanks.
- A temporary refuelling facility was setup at the CCE depot



Coca Cola bio-methane trial

- The overall performance of the gas vehicle scored 4.6
- Rated higher than the diesel that scored 4.1.

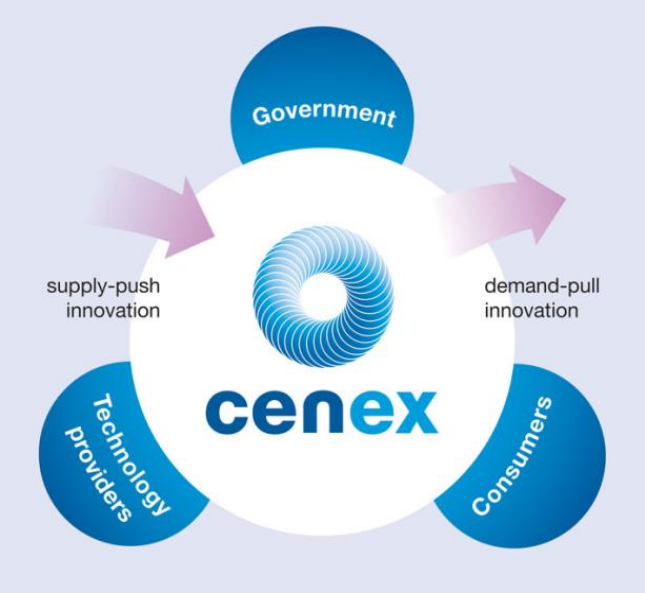




- The overall WTW savings achieved from bio-methane operation were 50.3% and 60.7% for the trial and permanent station scenarios respectively
- Gas vehicle operation reduced NOx by 85.8% and PM by 97.1%

Why work with Cenex?

- Running projects and programmes focused on accelerating the deployment of low carbon vehicles
  - Overseeing fleet deployment trials
  - Managing low carbon vehicle procurement
  - Providing fleet carbon reduction consultancy
  - Delivering the UKs national annual Low Carbon Vehicle event (LCV)
- Cenex clients include:



City of Westminster

Department for Transport

Sunderland City Council

ASDA

INDESIT We work, you play.

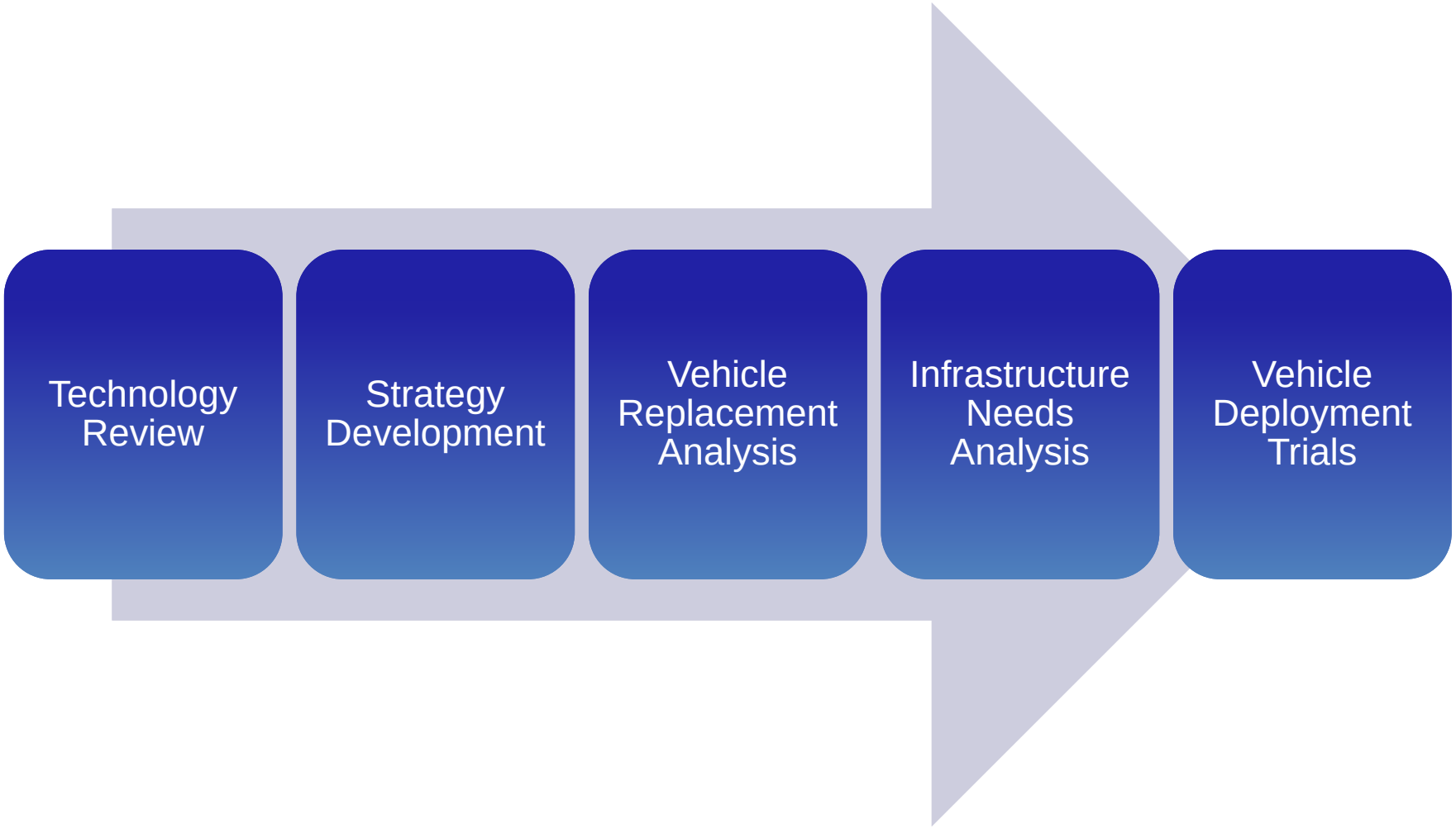
BIS Department for Business Innovation & Skills

Technology Strategy Board Driving Innovation

Coca-Cola Great Britain

Camden

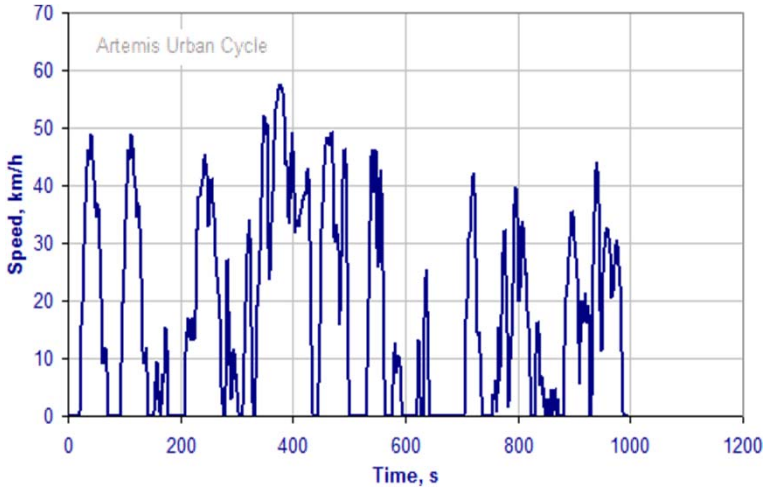
Fleet carbon reduction



Low Carbon Vehicle Deployment

Fleet Carbon Reduction Tool

- Our FCRT analysis provides a robust method of analysing the comparative performance of low carbon vehicles.
  - Different technologies can be directly evaluated and compared against existing fleet vehicles over identical driving conditions
  - Very short analysis times at a relatively low cost



		Electric passenger car											
		Current energy prices						Linear rising energy prices					
		90% Peak			90% Off-peak			90% Peak			90% Off-peak		
	Drive cycle	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7	Yr 3	Yr 5	Yr 7
Base Mileage	Company Car	531	375	336	398	241	202	388	136	2	254	3	-132
	Pool Car	556	419	389	492	355	325	449	241	140	385	177	75
Increased Mileage	Company Car	398	242	203	211	54	15	150	-149	-332	-51	-350	-532
	Pool Car	484	328	289	395	238	199	297	34	-112	201	-63	-208

For More Information

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