



The UK's first custom-built hydrogen refuse collection vehicle

Trevor Nicoll

Director of Operations
St Helens Council





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BOROUGH COUNCIL

PATHWAY TO NET ZERO BY 2040

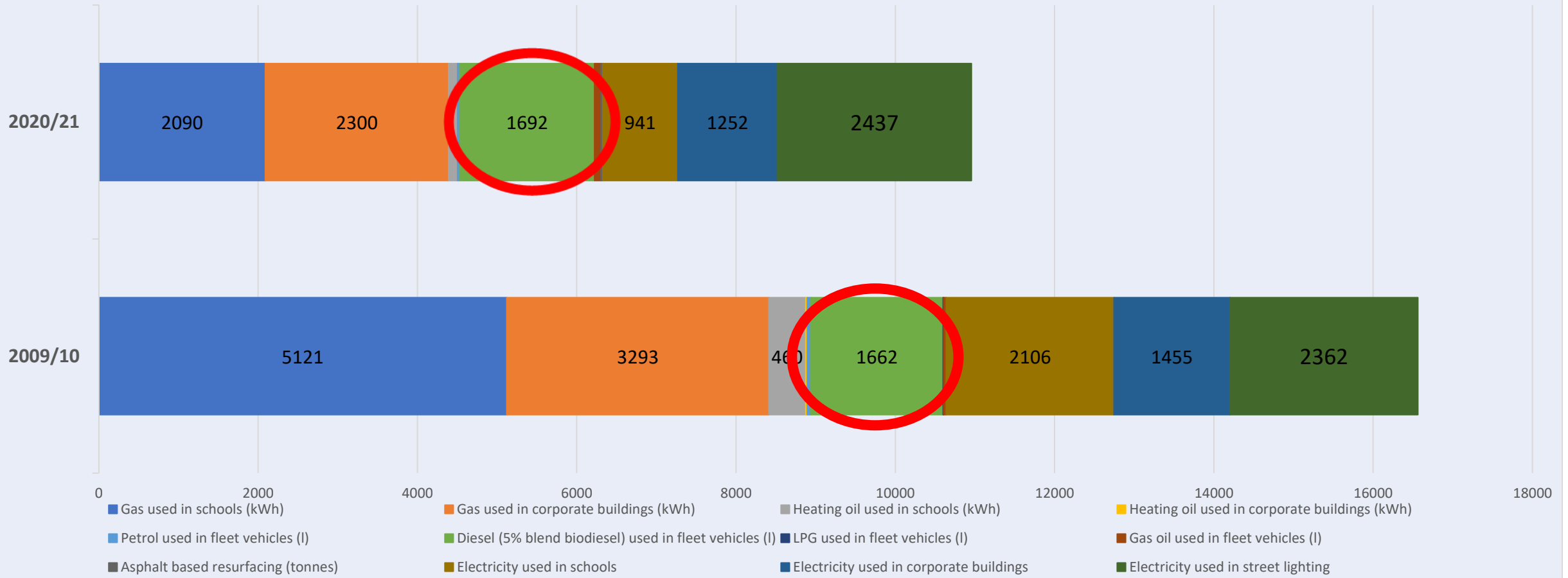
OUR CLIMATE RESPONSE PLAN NOVEMBER 2021



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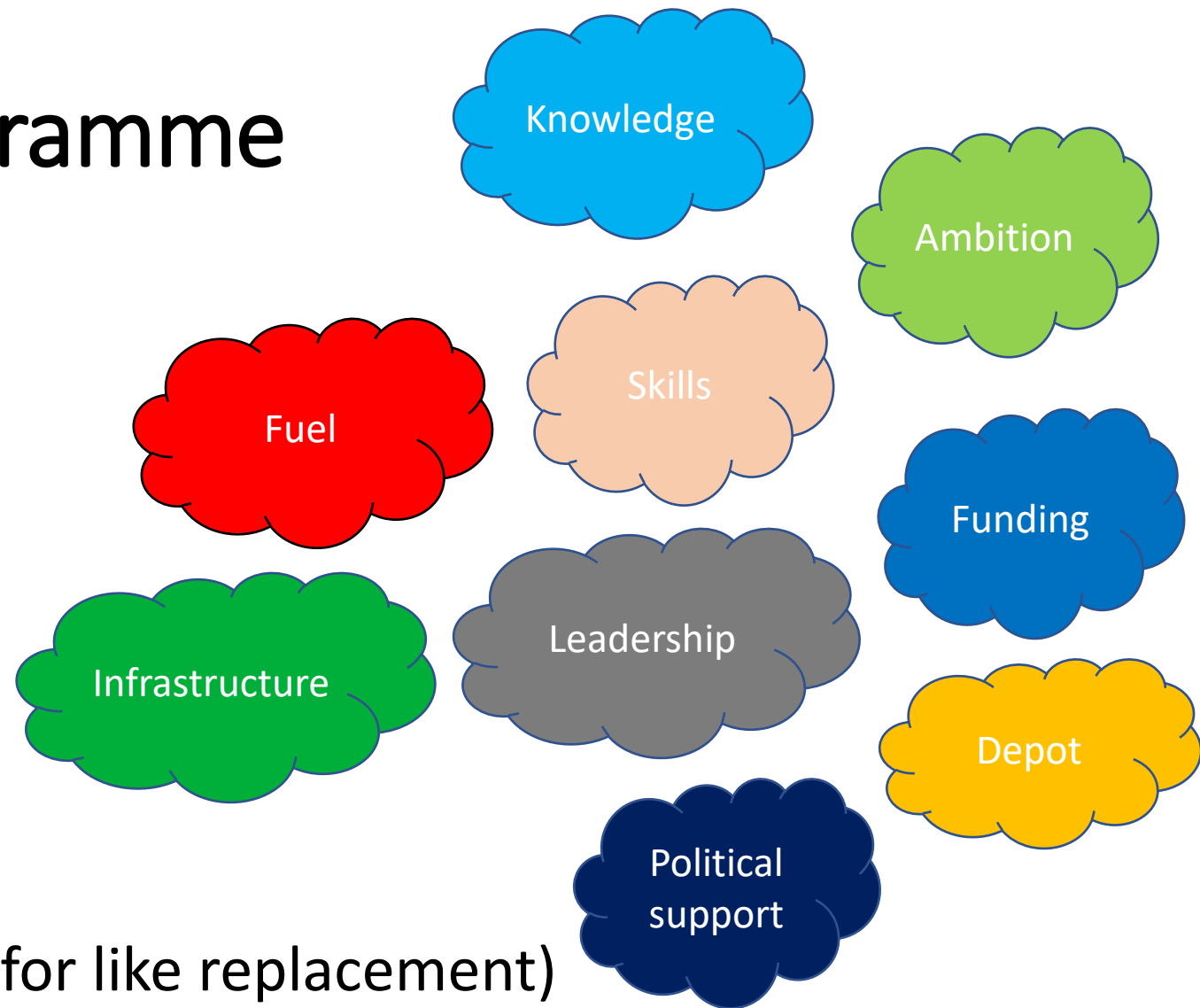
Carbon Emissions in St Helens

Emissions 22/23 vs 2009/10



Fleet Replacement Programme

- 225 items
 - Mayors Car
 - Buses
 - RCV
 - Small Van
 - Tractors & JCBs
 - Gritter
 - Sweeper
 - Movers
 - 3.5t tipper
- £21m replace costs (based on like for like replacement)



St. Helens

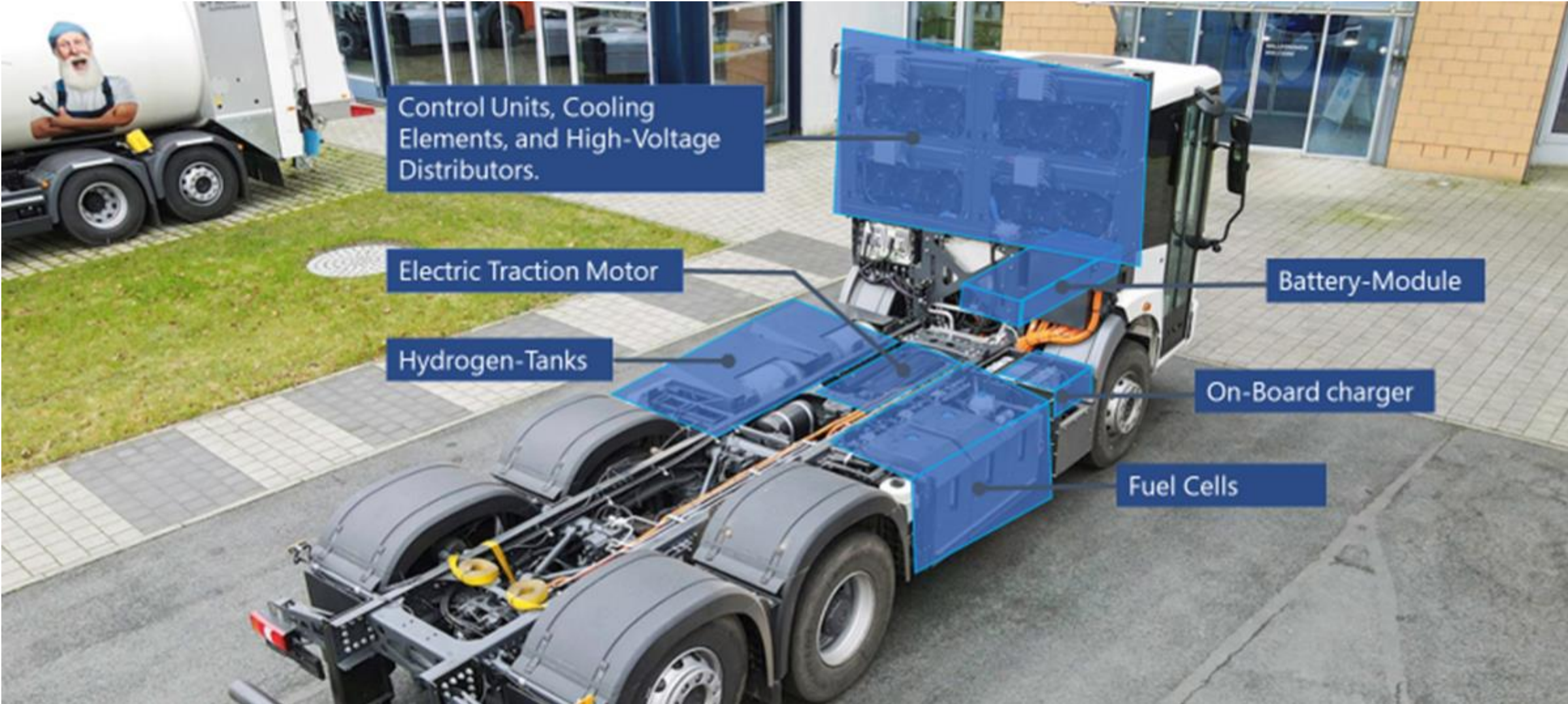
EX TERRA LUCEM

R.F.C.



Hydrogen
Journey

Hydrogen fuel cell vehicle

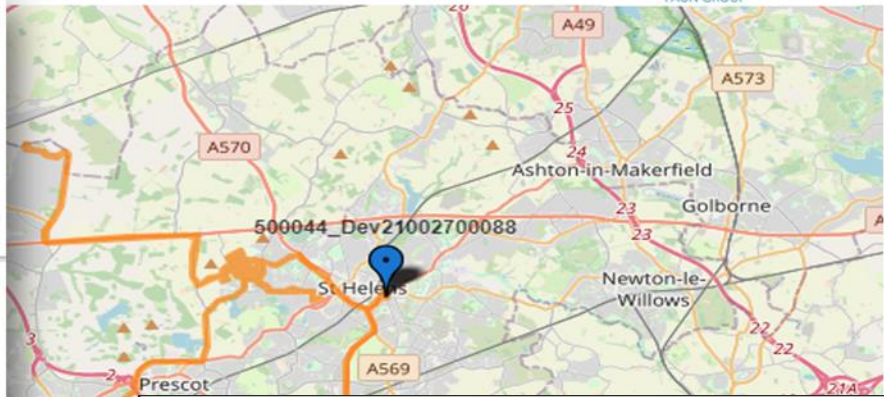
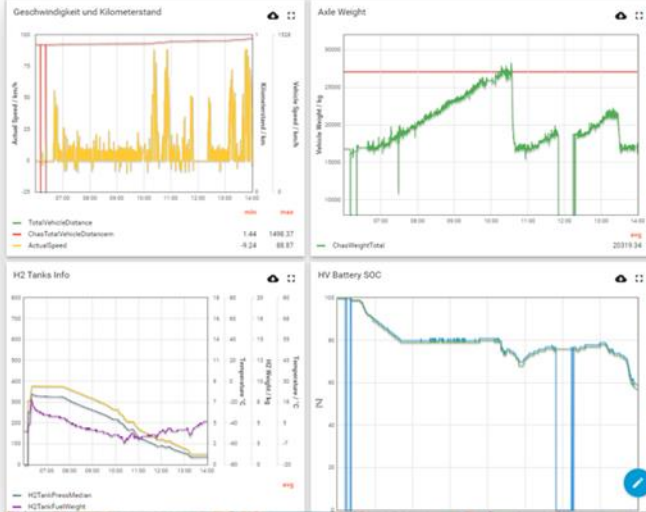




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Data & Information



DATA SUMMARY														FAUN		ZOELLER	
W/C 10th July 2023														ENGINIUS		FAUN GROUP	
Collection Round starts	Amount of Waste [Kg]			H2 Energy			Battery Energy			Summary				Comments			
03/07/2023 06:14:00 13:39:00	51	7400	0	7400	No	7.92	118.79	100	0	73	25.65	144.44	9.63	145.10	0.0195	2.8321 FC temperature fluctuations	
04/07/2023 06:06:00 13:45:00	55	5000	0	5000	No	6.15	92.24	100	0	79	19.95	112.19	7.48	90.91	0.0224	2.0398 ID302: FC Breakdown - Reset required	
05/07/2023 06:04:00 14:09:00	75	10200	0	10200	No	6.89	103.34	100	0	48	49.4	152.74	10.18	136.00	0.0150	2.0365 Refuelling station fault - 200bar max. Truck ran out gas 1pm	
06/07/2023 06:05:00 14:38:00	66	7400	0	7400	No	7.72	115.79	100	0	62	36.1	151.89	10.13	112.12	0.0205	2.3013 ID302 @ starting - reset required - carried over from yesterday	
07/07/2023 06:09:00 14:26:00	57	4000	0	4000	No	7.32	109.79	99	0	68	29.45	139.24	9.28	70.18	0.0348	2.4428 ID302 FC Breakdown 11.15 - reset required	
08/07/2023 TOTALS	304	34000	0	34000		36.0	539.9			160.55	700.5	46.7	554.3	0.1123	11.7		
09/07/2023 AVERAGES	60.8	6800	0.0	6800		7.2	108.0			32.1	140.1	9.3	110.9	0.0225	2.3		
10/07/2023 06:10:00 15:05:00	54	9900	0	9900	No	7.82	117.29	100	0	66	32.3	149.59	9.97	183.33	0.0151	2.7702 ID302: FC Shutdown - Reset required - Temperature?? LH lit	
11/07/2023 06:06:00 13:44:00	55	7700	0	7700	No	7.75	116.24	99	0	71	26.6	142.84	9.52	140.00	0.0186	2.5971 Cooling fans running overnight?? Hard Reset to stop.	
12/07/2023 06:07:00 14:19:00	56	10200	0	10200	No	7.26	108.89	100	0	81	18.05	126.94	8.46	182.14	0.0124	2.2668 ID151 Insulation Clamp 31	
13/07/2023 06:14:00 14:09:00	57	10000	0	10000	No	6.91	103.64	100	0	66	32.3	135.94	9.06	175.44	0.0136	2.3849 OBC diagnostic (pm) FC2 & 1 Coolant 100ml, FC3 200ml	
14/07/2023 06:02:00 13:43:00	50	8900	0	8900	No	5.52	82.79	99	0	45	51.3	134.09	8.94	178.00	0.0151	2.6818 ID159 24V battery warning displayed	
15/07/2023 TOTALS	272	46700	0	46700		35.3	528.8			160.55	689.4	46.0	858.9	0.0748	12.7		
16/07/2023 AVERAGES	54.4	9340	0.0	9340		7.1	105.8			32.1	137.9	9.2	171.8	0.0150	2.5		
17/07/2023 06:09:00 13:41:00	48	8000	0	8000	No	6.19	92.84	100	0	78	20.9	113.74	7.58	166.67	0.0142	2.3696 ID159 24V battery warning displayed	
18/07/2023 06:12:00 13:16:00	52	5400	0	5400	No	1.2	18.00	99	0	51	45.6	63.60	4.24	103.8462	0.0118	1.2230 ID302 FC Shutdown - Reset required	
19/07/2023 05:49:00 14:11:00	49	10200	0	10200	No	10.49	157.33	99	0	76	21.85	179.18	11.95	208.1633	0.0176	3.6568 ID159 24V battery warning displayed	
20/07/2023 06:05:00 13:57:00	51	5800	0	5800	No	5.11	76.64	100	0	49	48.45	125.09	8.34	113.7255	0.0216	2.4528 ID159 24V battery warning displayed	
21/07/2023 06:05:00 13:35:00	53	5700	0	5700	No	4.22	63.29	100	0	56	41.8	105.09	7.01	107.5472	0.0184	1.9829 ID151 Insulation Clamp 31	
22/07/2023 TOTALS	253	35100	0	35100		27.2	408.1			178.6	586.7	39.1	699.9	0.0836	11.7		
23/07/2023 AVERAGES	50.6	7020	0.0	7020		5.4	81.6			35.7	117.3	7.8	140.0	0.0167	2.3		
24/07/2023 06:00:00 14:51:00	60		0			4.06	60.89	0		0	60.89		4.06	0.00		#DIV/0!	
25/07/2023 06:00:00 13:42:00	55	7800	0	7800	No	6.39	95.84	100	0	59	38.95	134.79	8.99	141.8182	0.0173	2.4507 BP Portal outage until 06.49am - FC3 coolant 200ml	
26/07/2023 06:03:00 14:20:00	55	9000	0	9000	No	6.84	102.59	100	0	80	19	121.59	8.11	163.64	0.0135	2.2107 ID159 24V battery warning displayed	
27/07/2023						0.00	0.00			0.00	0.00	0.00	0.00	0.00		#DIV/0!	
28/07/2023						0.00	0.00			0.00	0.00	0.00	0.00	0.00		#DIV/0!	
29/07/2023 TOTALS	170.1	16800	0	16800		17.3	259.3			57.95	317.3	71.2	305.5	0.0308	5.7		
30/07/2023 AVERAGES	56.7	8400	0.0	8400		5.8	86.4			29.0	63.5	4.2	152.7	0.0154	1.9		
31/07/2023						0.00	0.00			0.00	0.00	0.00	0.00	0.00		#DIV/0!	

- WEEKLY BATTERY CONSUMPTION**
 - Average Daily Battery Energy = 32.1kWh
 - Total Weekly Battery Energy = 160.55kWh
- WEEKLY HYDROGEN CONSUMPTION @ 350bar**
 - Average Daily Hydrogen used = 7.1Kg / 105.8kWh
 - Total Weekly Hydrogen used = 35.3Kg / 528.8kWh
- WEEKLY COMBINED ENERGY CONSUMPTION**
 - Average Daily = 137.9kWh - Hydrogen equivalent of 9.2Kg
 - Weekly Total = 689.4kWh - Hydrogen equivalent of 46Kg
- WEEKLY ROUTE INFO:**
 - Average Daily Driving Distance = 54.4Km (34 miles)
 - Total Weekly Driving Distance = 272Km (170 miles)
- Average Route Efficiency = 2.5kWh per Km
- Average Route Efficiency = 0.0150kWh (15Wh) per Kg
- Average Route Efficiency = 171.8Kg per Km
- Average Daily Weight = 9340Kg
- Weekly Total Weight = 46700Kg

Partnering & Knowledge Transfer



HyNet
North West





Skills, Training and Apprenticeships



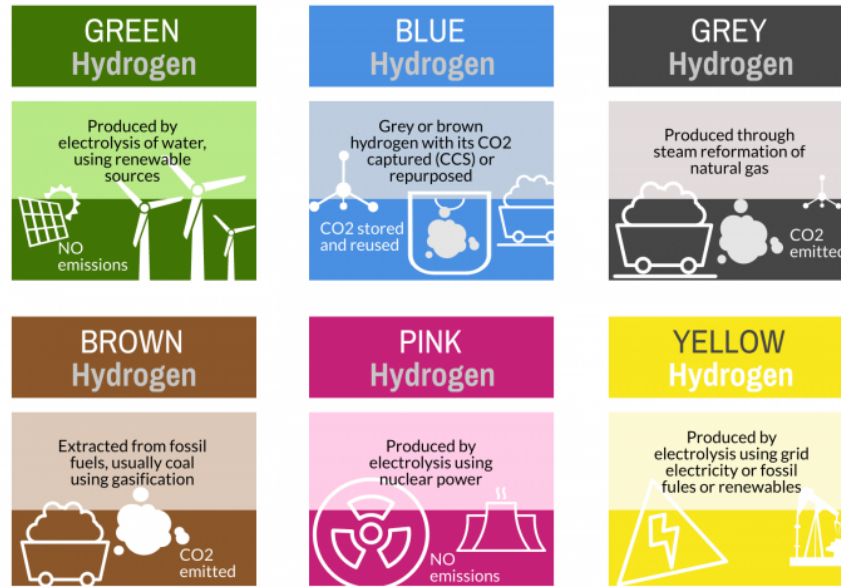
Education and Engagement



Infrastructure & fuelling

Types of hydrogen and technologies

Depending on the type of production used and level of emissions, different colours are assigned to hydrogen.



Electric Journey



Electric Journey

- 35 vehicles
 - Mayors Car (1)
 - Electric Recycling Vehicles (2)
 - Small Vans (25)
 - Panel Vans (6)
 - Utility Vehicle (1)
- Plus
 - Hand Mowers (5)
 - Handheld plant Chain saws, brush cutters ...



Electric Journey

- Installed a managed network of charger system.
- Currently at capacity on site with 500kVa substation.
- 1000kVa substation to replace current.
- 18 – 24 months delay.



St. Helens

EX TERRA LUCEM

R.F.C.



Thank you
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