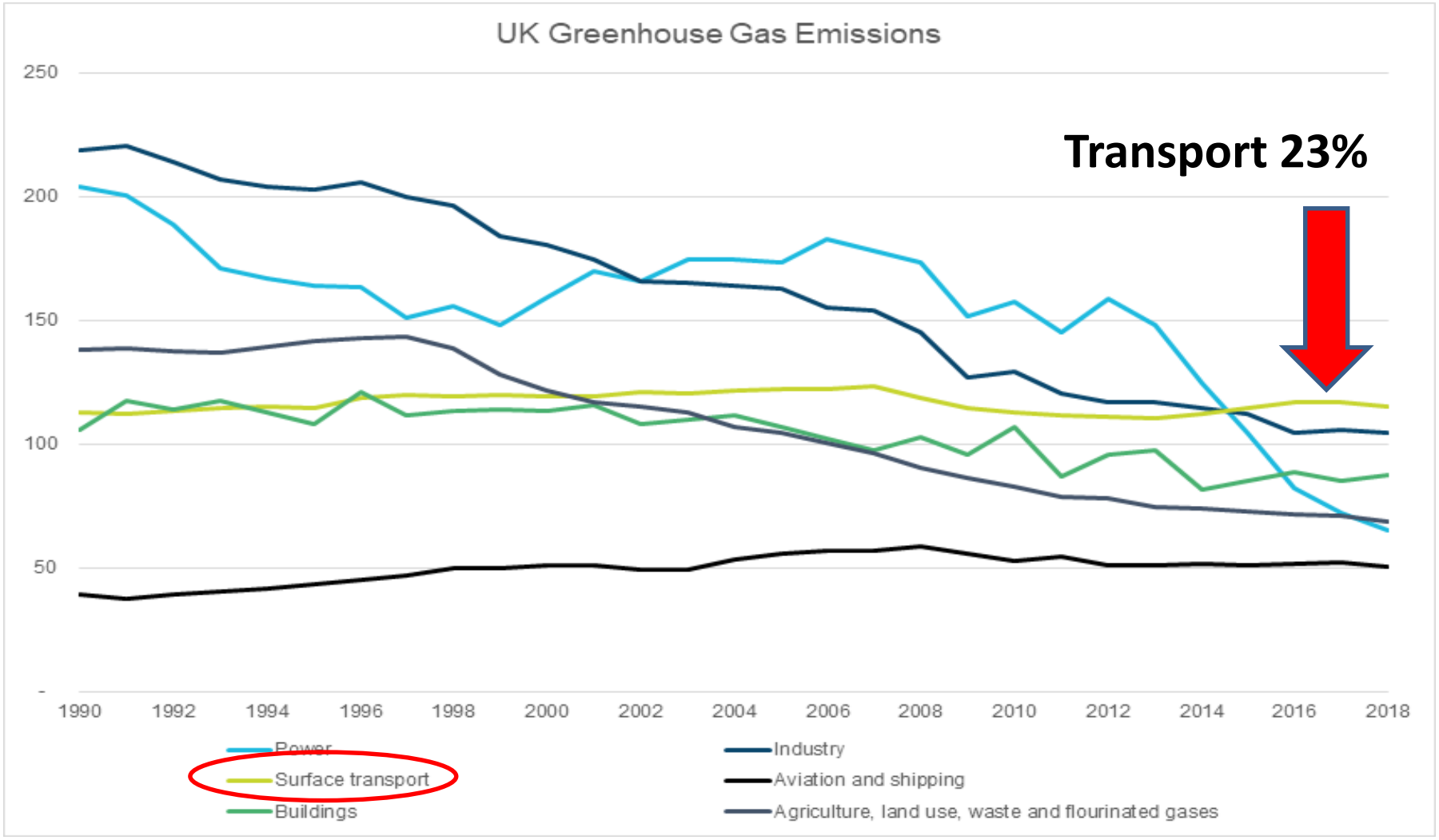
The Transition to Low Carbon Transport

Ralph Watts

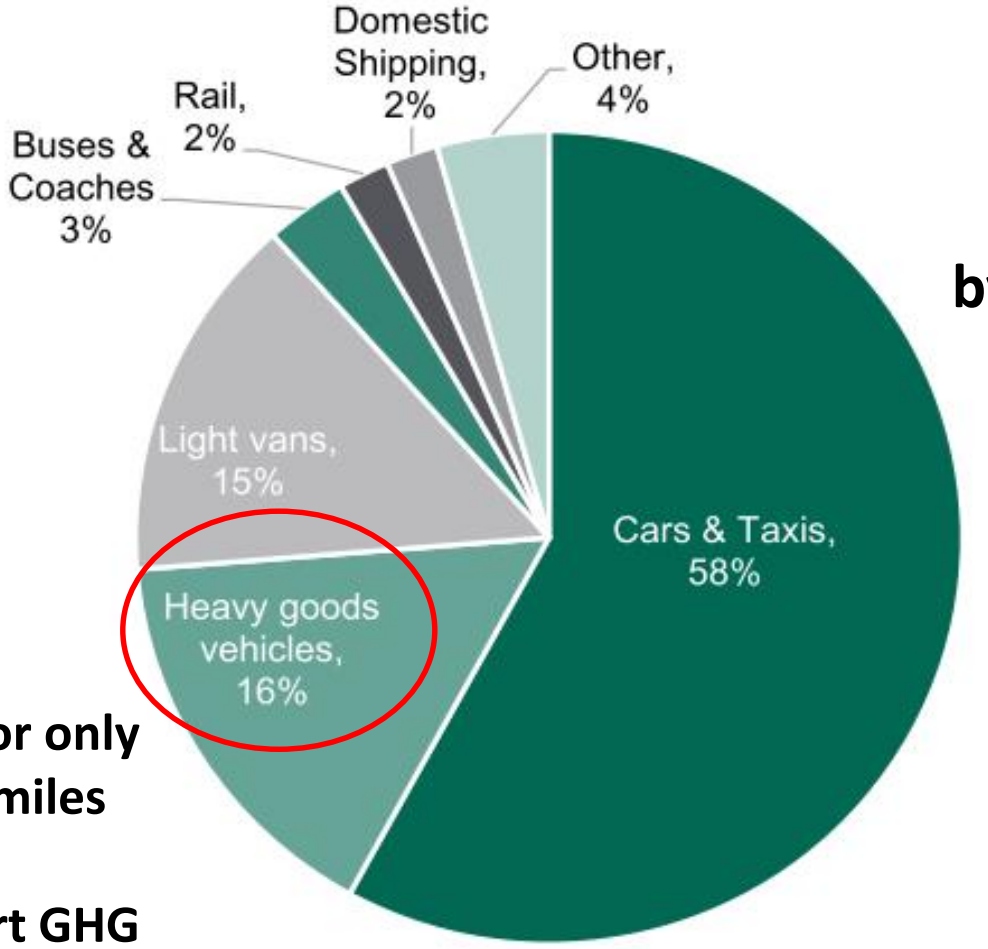
Topics Covered

- GHG Emissions from Transport
- Fully Electric and Hydrogen Vehicle Systems
  - Fuel & Maintenance Costs
  - Infrastructure Costs
  - Availability

DC Seminar for Town & Parish Councils



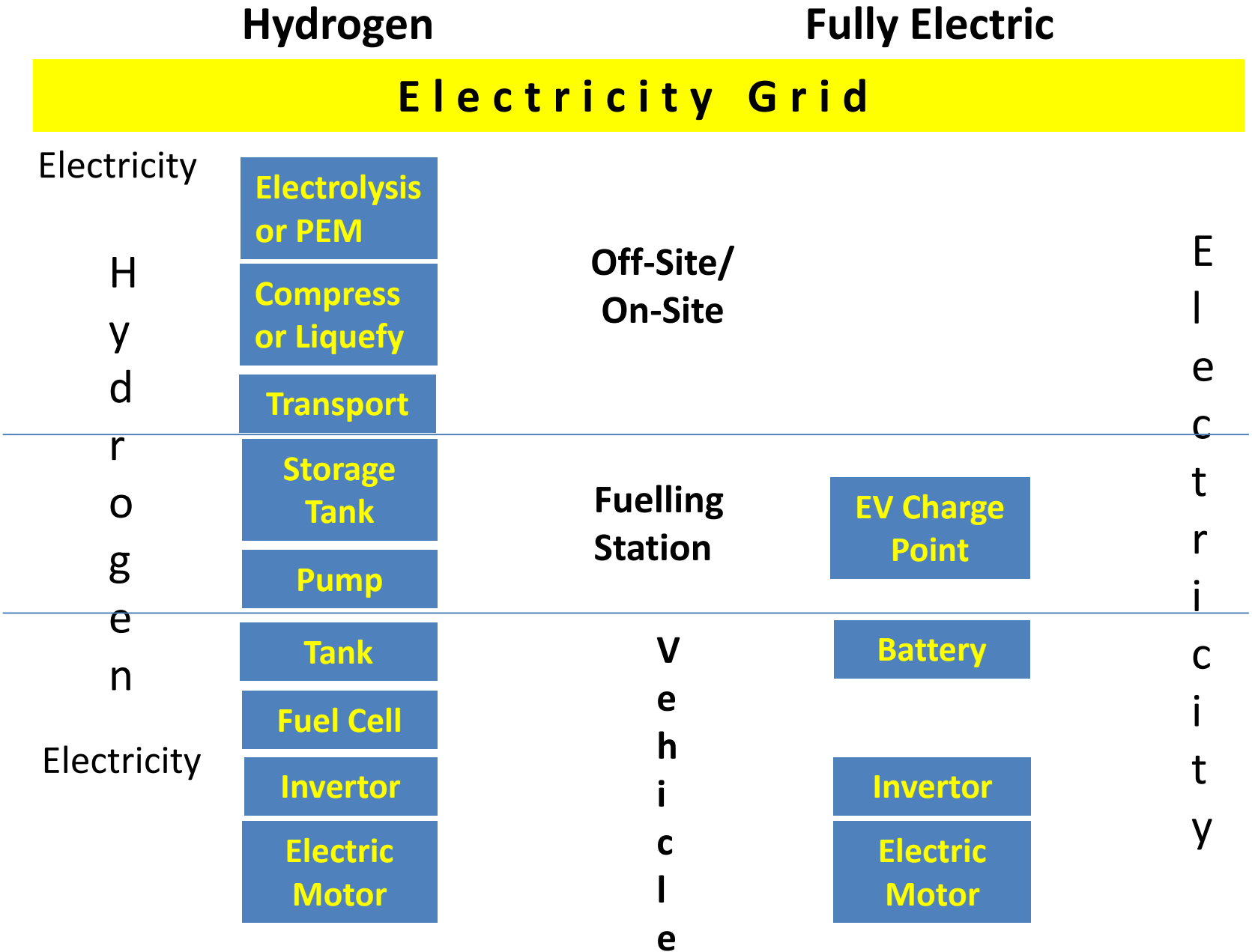
DfT Freight Carbon Review 2017



GHG Emissions by Transport Mode

HGVs account for only 5% of vehicle miles BUT 16% of Transport GHG Emissions

Fuel & Maintenance Costs



Fuel & Infrastructure Costs

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

Scenario	Energy Consumed (PJ)	Annualised CAPEX at 2060 (£million)	Annual Fuel Cost (£million)	Total Annual Cost (£million)	Cumulative CAPEX by 2060 (£billion)
Baseline	216	0	2,950	2,950	0
Hydrogen	97	290	1,290	1,580	3.4
Battery EV	67	1,040	860	1,900	21.3

RICARDO

Ricardo Energy & Environment

Fuel Cost & Capital Cost

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

Scenario	Energy Consumed (PJ)	Annualised CAPEX at 2060 (£million)	Annual Fuel Cost (£million)	Total Annual Cost (£million)	Cumulative CAPEX by 2060 (£billion)
Baseline	216	0	2,950	2,950	0
Hydrogen	97	290	1,290	1,580	3.4
Battery EV	67	1,040	860	1,900	21.3

RICARDO

Ricardo Energy & Environment

Fuel Cost & Capital Cost

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

Scenario	Energy Consumed (PJ)	Annualised CAPEX at 2060 (£million)	Annual Fuel Cost (£million)	Total Annual Cost (£million)	Cumulative CAPEX by 2060 (£billion)
Baseline	216	0	2,950	2,950	0
Hydrogen	97	290	1,290	1,580	3.4
Battery EV	67	1,040	860	1,900	21.3

Main Infrastructure Cost is Depot Chargers

RICARDO

Ricardo Energy & Environment

Fuel Cost & Capital Cost

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

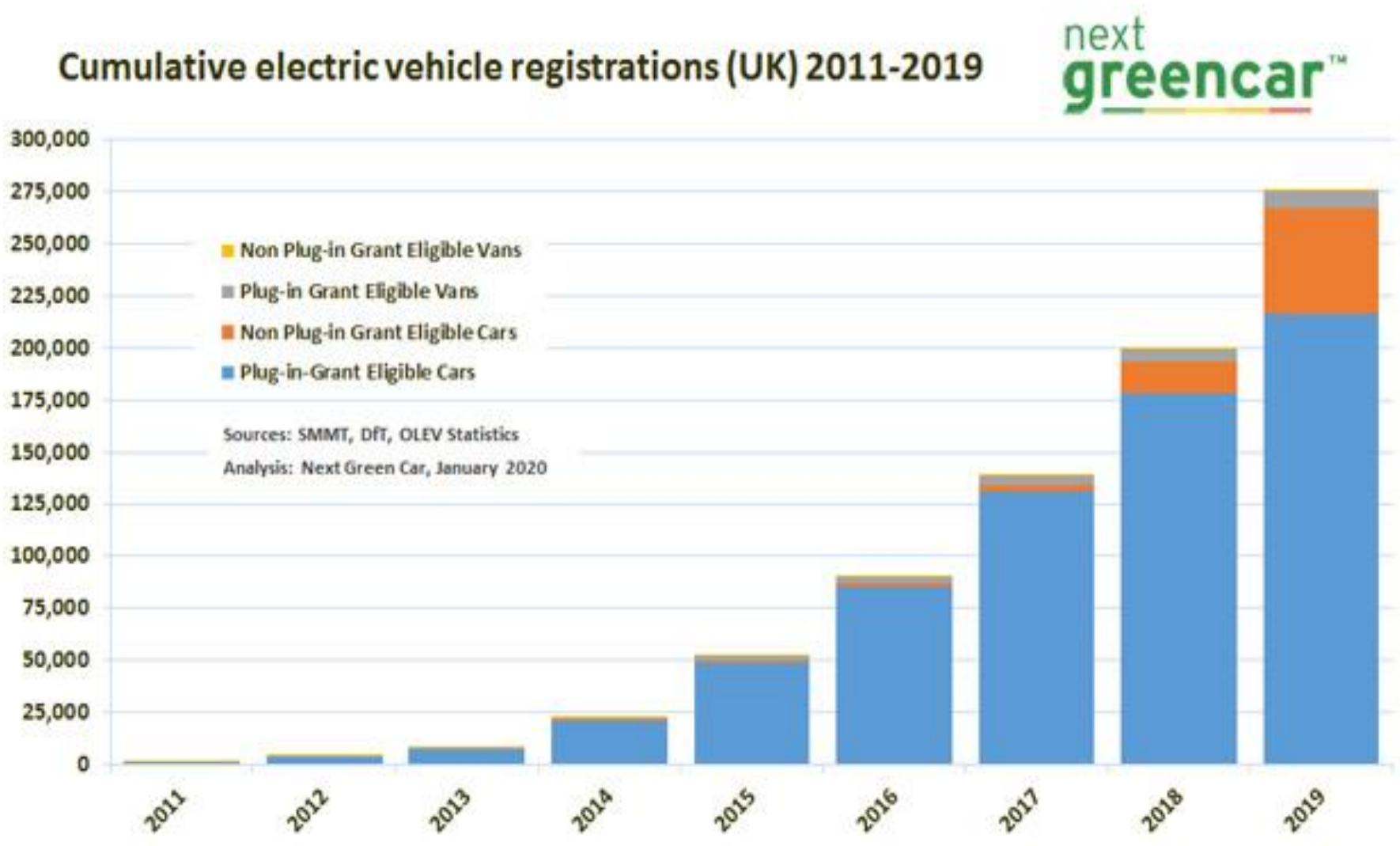
Scenario	Energy Consumed (PJ)	Annualised CAPEX at 2060 (£million)	Annual Fuel Cost (£million)	Total Annual Cost (£million)	Cumulative CAPEX by 2060 (£billion)
Baseline	216	0	2,950	2,950	0
Hydrogen	97	290	1,290	1,580	3.4
Battery EV	67	1,040	860	1,900	21.3

About 15% Difference

RICARDO

Ricardo Energy & Environment

Availability – EV Cars & Vans



Availability - Buses

BYD Saloon

Nottingham
Fleet of 71 fully electric buses
Purchased between 2012 and 2017
Charging Network funded by OLEV LEBS Grant

Optare Solo

Optare Versa

Fuel Cost Savings (£300,000 pa on 45 buses)
Lower Maintenance Costs
No Vehicle Excise Duty

Market Review Hydrogen HGVs

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

Manufacturer	Number of Models	Range	Size	Region
Nikola	3	500 to 1200	Artic	US & Europe
Plug Power & Workhorse	1	160	Small Rigid	US
Kenworth Company	1	300	Artic	US
Toyota Motor	1	300	Artic	US
Hyundai	2	240	Large Rigid/Artic	US & Europe

RICARDO

Ricardo Energy & Environment

Market Review Electric HGVs

Ricardo Energy & Environment – Zero Emission HGV Infrastructure Requirements Report for Committee on Climate Change May 2019

Manufacturer	Number of Models	Range	Size	Region
Tesla	1	300 to 500	Artic	US
Renault	3	190	Small/Large Rigid	Europe
Mercedes	1	124	Small/Large Rigid	Europe
BYD	3	155	Rigid/Artic	China, Europe, US
Volvo	3	186	Rigid/Arctic	US & Europe
VW	1	124	Small Rigid	Europe, UK
Peterbilt	2	100	Small Rigid/Artic	US
Arrival	1	100 to 150	Small Rigid	UK
Iveco	3	140	Large Rigid/Artic	Europe, US
DAF	2	140	Large Rigid/Artic	Europe

RICARDO

Ricardo Energy & Environment

Waste Collection

In Summary

Both EV and Hydrogen yield savings compared to Diesel HGVs

EVs are either already available or soon to be available for all vehicle types across the Dorset Council fleet

Availability of Hydrogen fuel cell vehicles is more limited, from a short list of suppliers

Questions

?