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# Future HGVs in the Context of the Overall Energy System

Matthew Joss

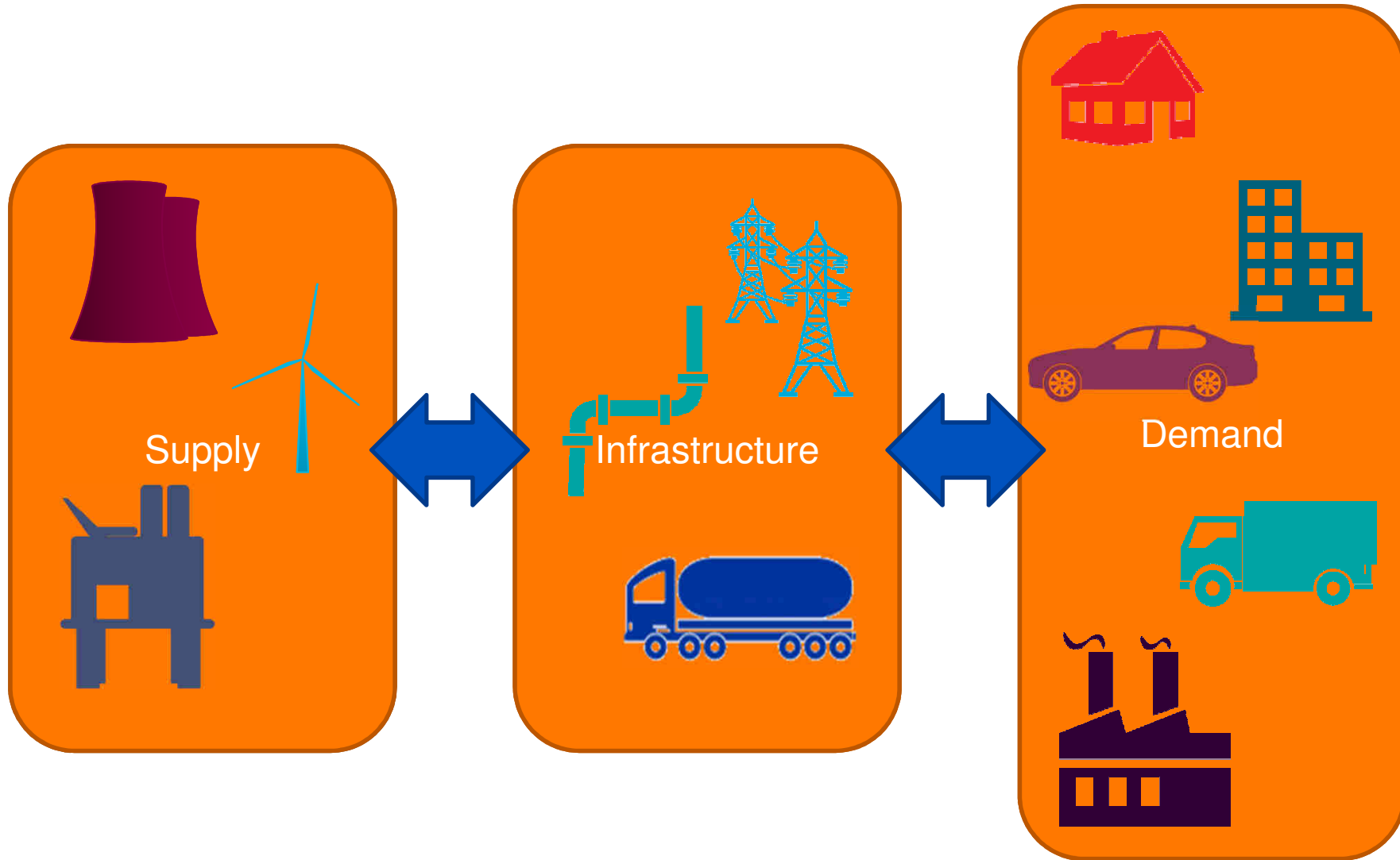


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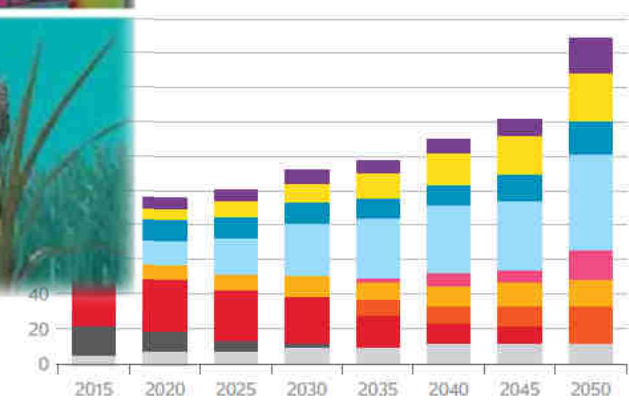
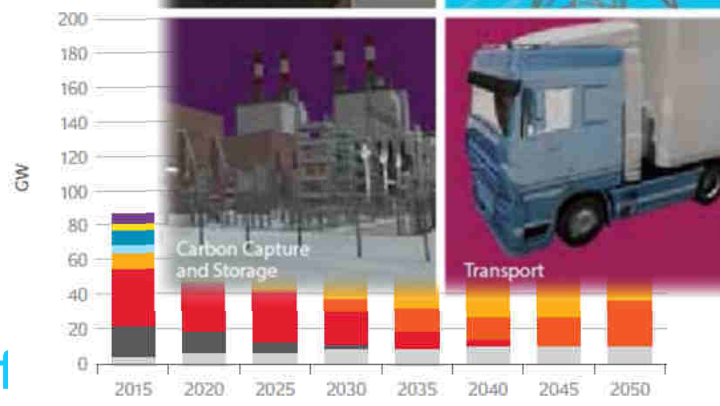
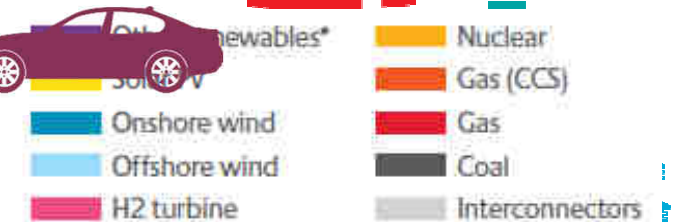
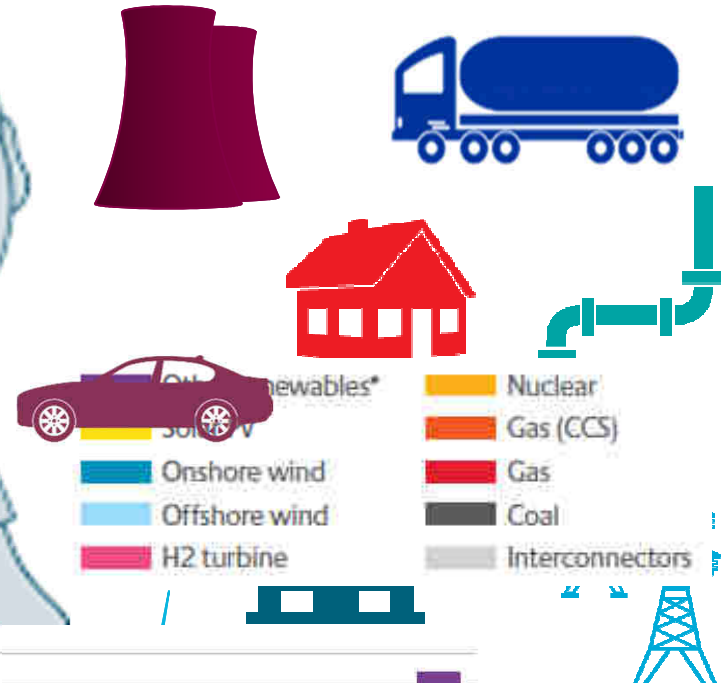
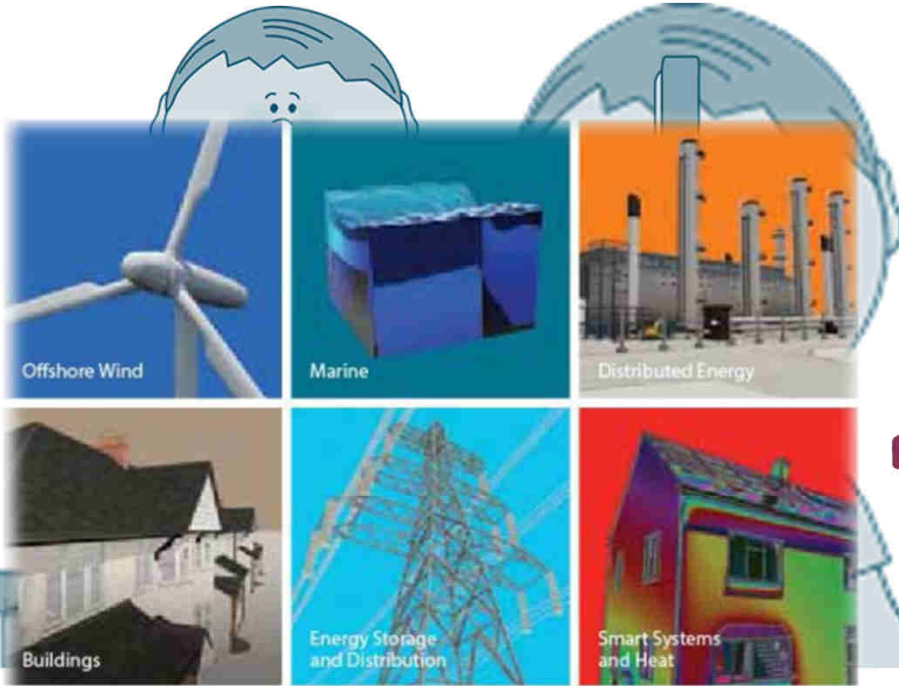


# Perspective





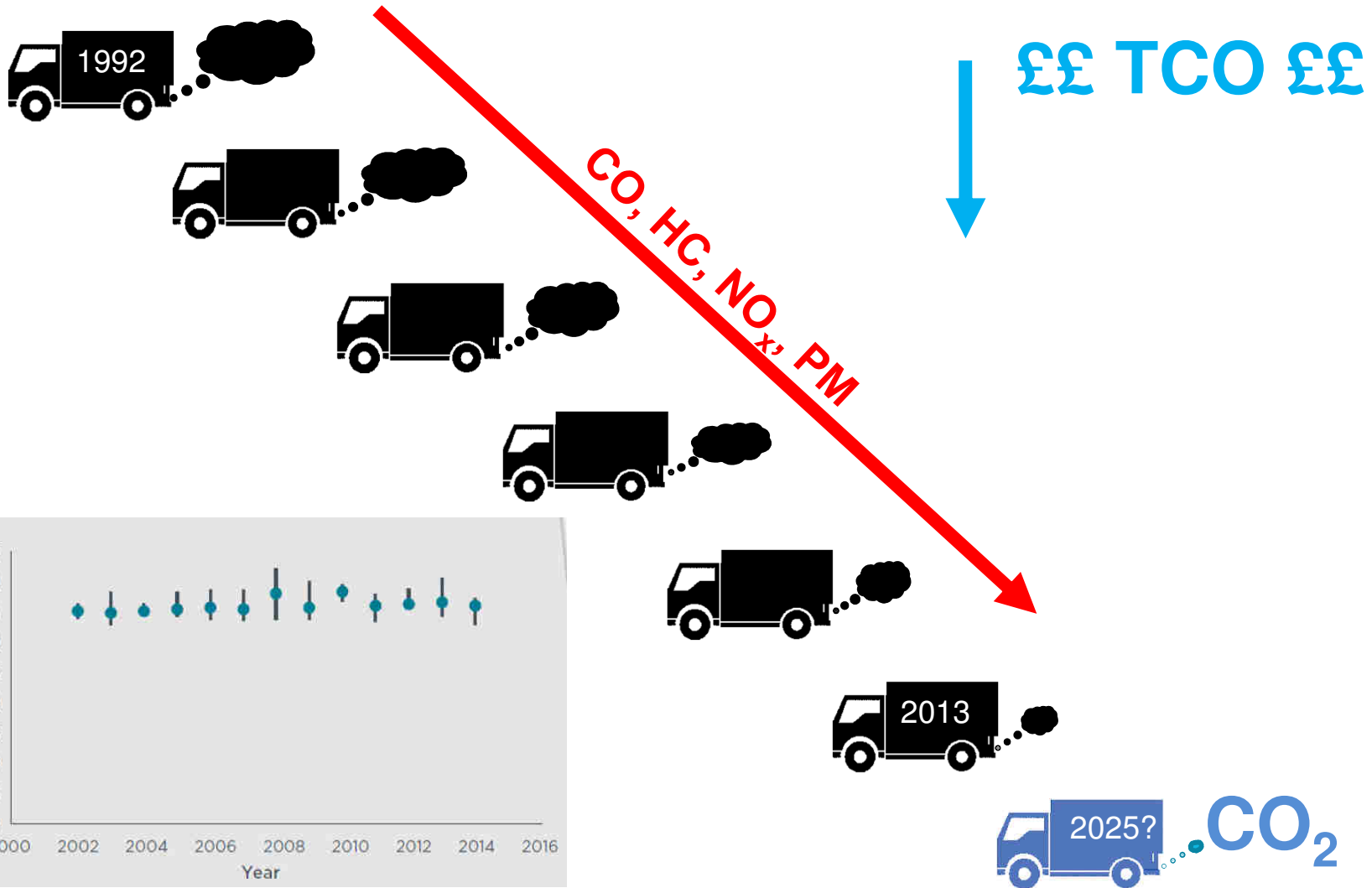
# How the ETI gain a Systems Perspective



Efi



# HGV OEM's Perspective

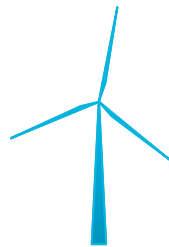
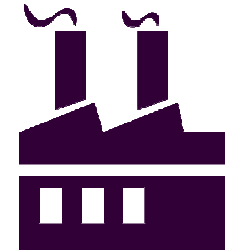
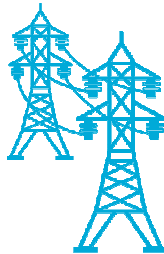
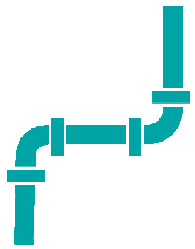




# A Different Perspective



Efficiency **2050** £





# HGV's in ESME



MGV 7–8t Rigid



MGV 8–17t Rigid



HGV 18–25t Rigid



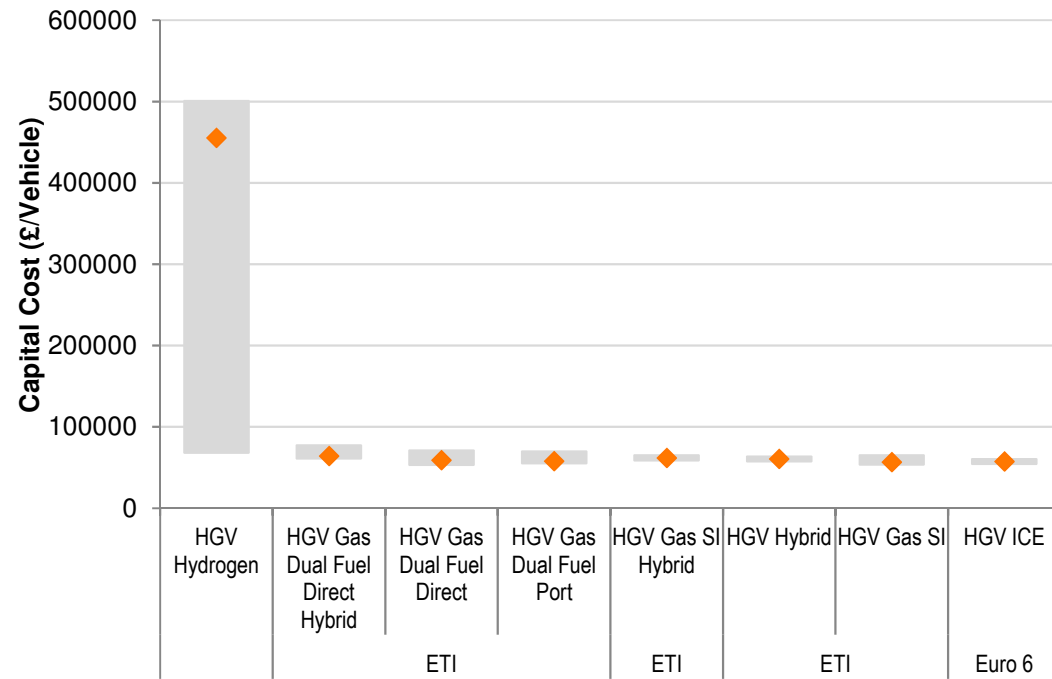
HGV >25t Rigid



HGV <33t Artic

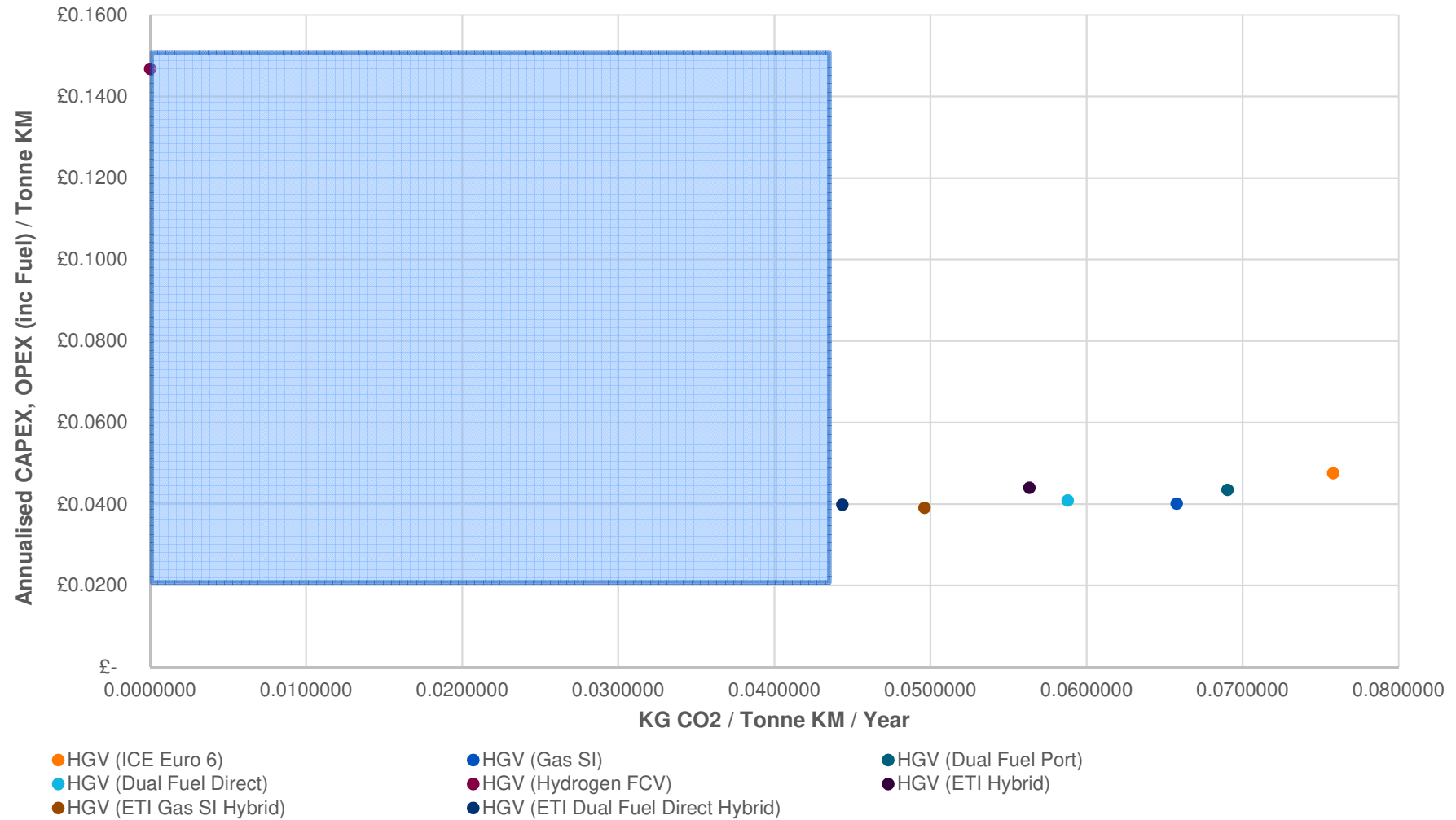


HGV >33t Artic



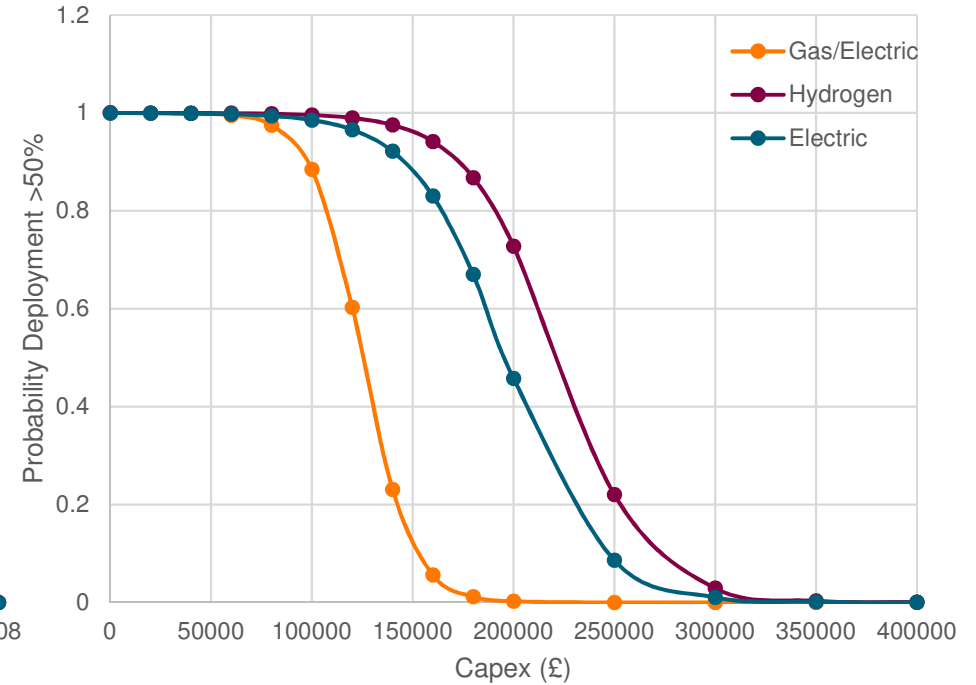
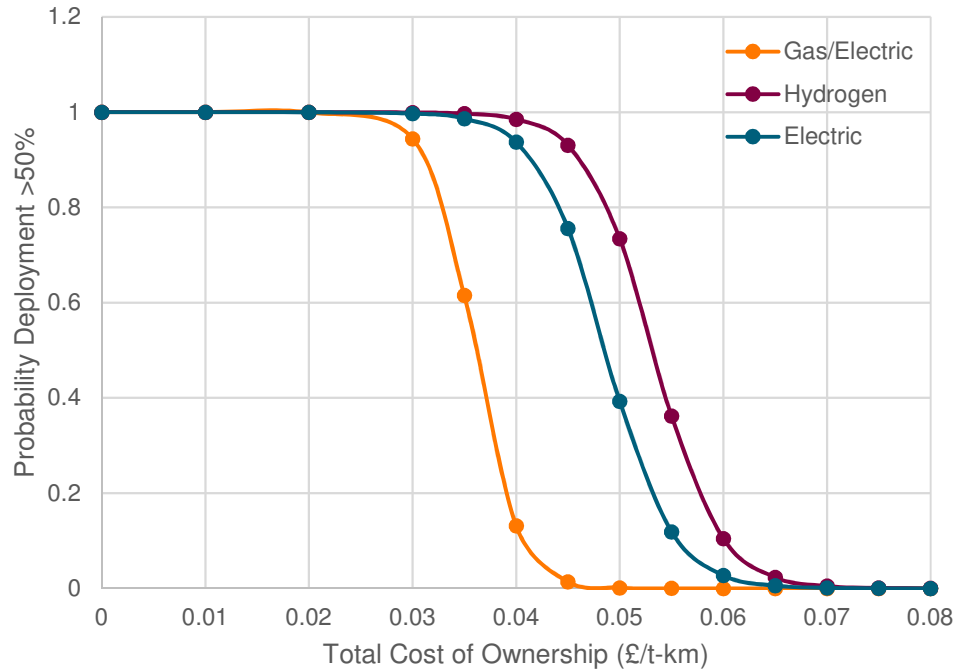


# What have we done





# 2050 >33t Articulated HGV



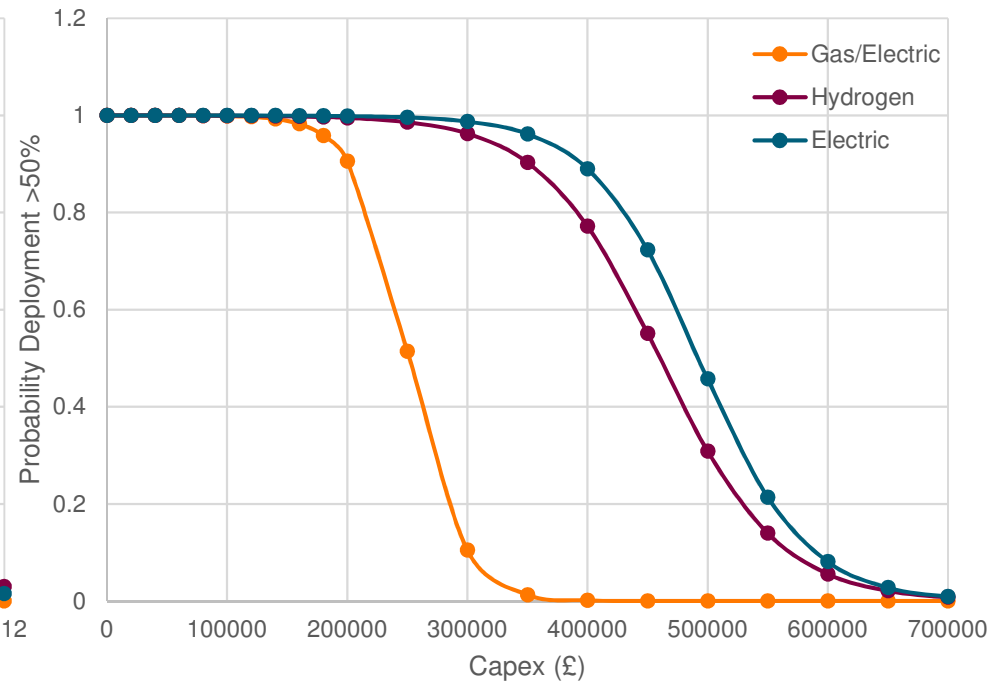
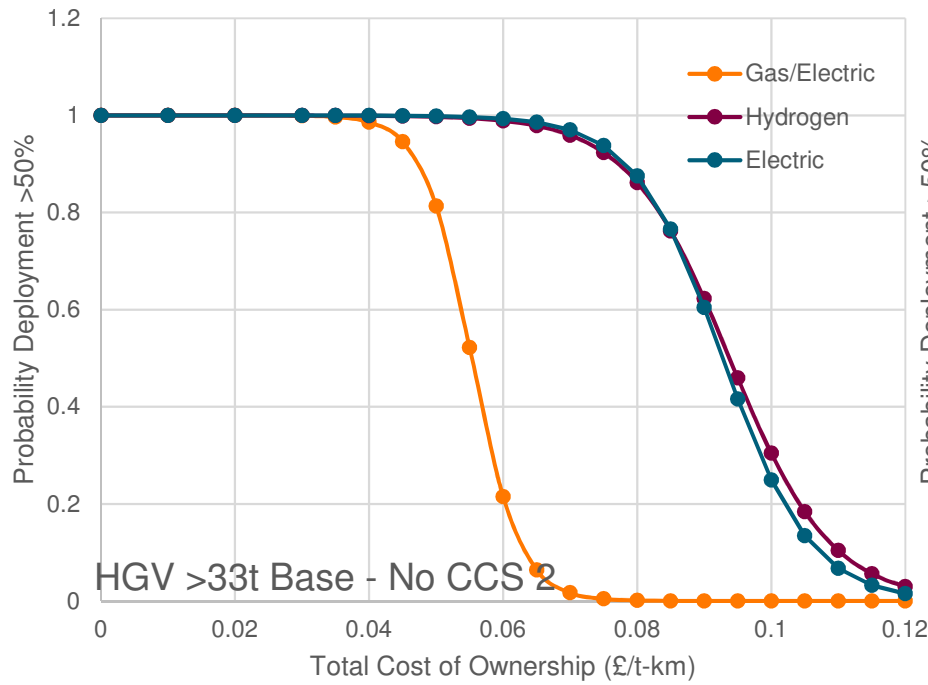
$$TCO_{2050,i} = \frac{(Annualisation\ Factor \times Scale\ Factor_{2050,i} \times Capex_{2010}) + Fuel\ Cost_{2050,i} + Opex}{Annual\ tonne - km}$$

Gas/electric = 0.02kgCO<sub>2</sub>/t-km





# 2050 >33t Articulated HGV - No CCS



$$TCO_{2050,i} = \frac{(Annualisation\ Factor \times Scale\ Factor_{2050,i} \times Capex_{2010}) + Fuel\ Cost_{2050,i} + Opex}{Annual\ tonne - km}$$

Gas/electric = 0.02kgCO<sub>2</sub>/t-km



## Analysis



£24<sub>b</sub>

£6.9<sub>b</sub>

£13.1<sub>b</sub>



# Perspective



2017



2050





# Questions



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## Future HGVs in the Context of the Overall Energy System – Backup Material

**ETI10** | TEN YEARS  
OF INNOVATION  
2007 – 2017

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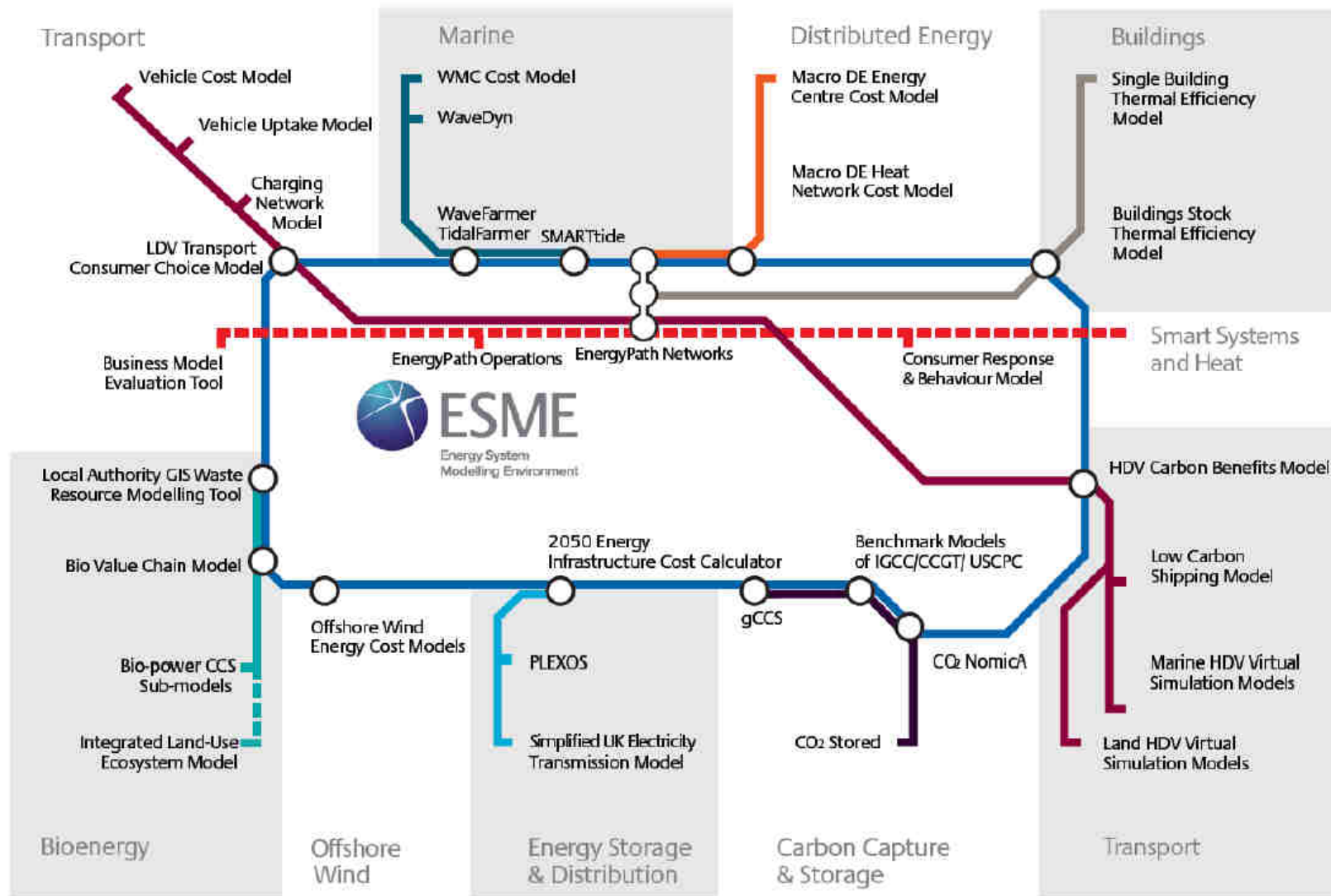
# Assumptions



- Annualisation Factor is a function of:
  - Economic Life of 10 Years
  - Technical Life of 15 Years
- Mileage & Average Freight Carried per Trip
  - 7-8t Rigid – 29000km – 1.92T
  - >8-17t Rigid – 32000km – 3.07T
  - >17-25t Rigid – 42000km – 3.16T
  - >25t Rigid – 41000km – 6.58T
  - <33t Artic - 64000km – 4.91T
  - >33t Artic – 93000km – 11.32T



# ESME Model Input



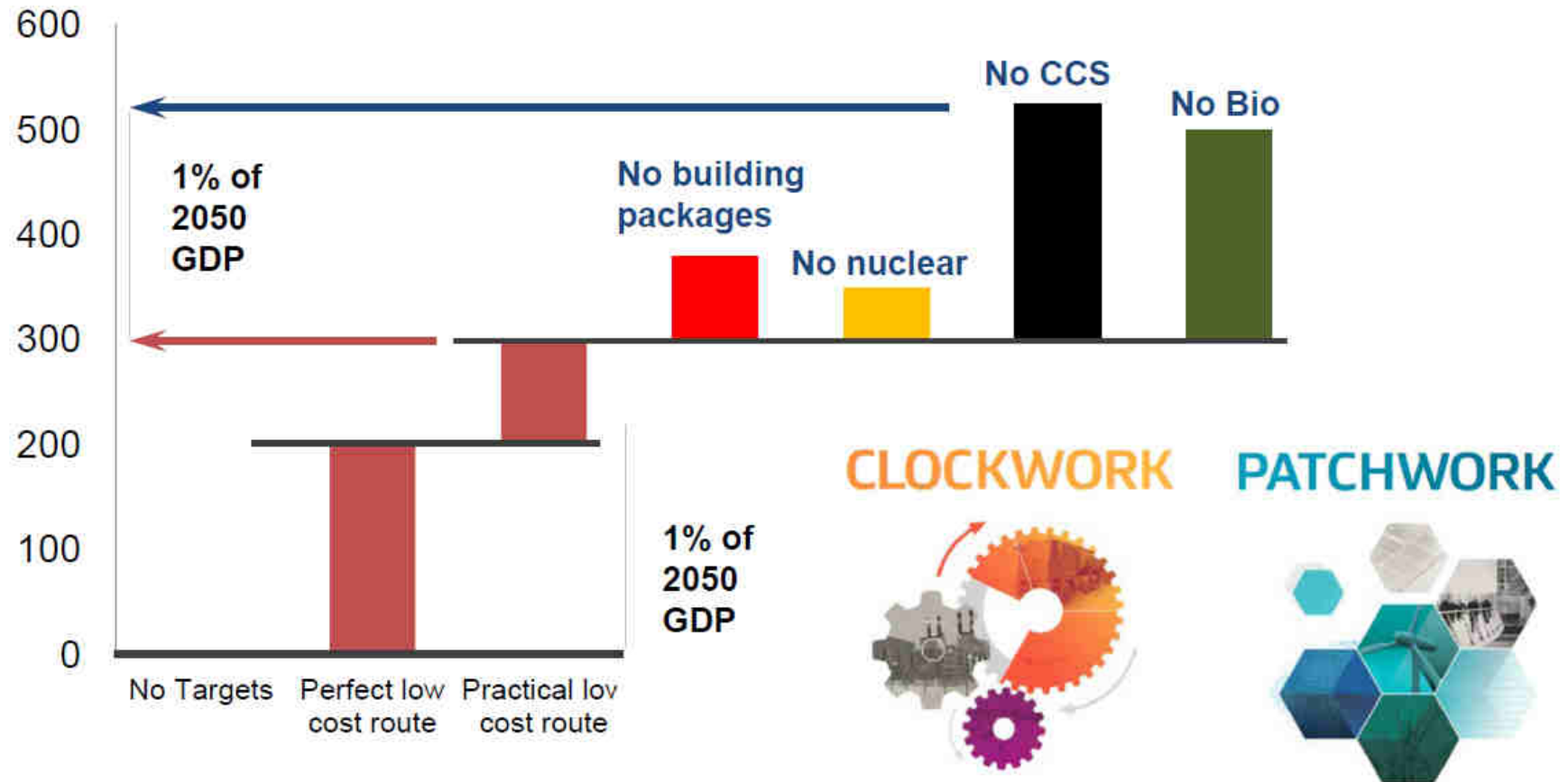




# ESME System

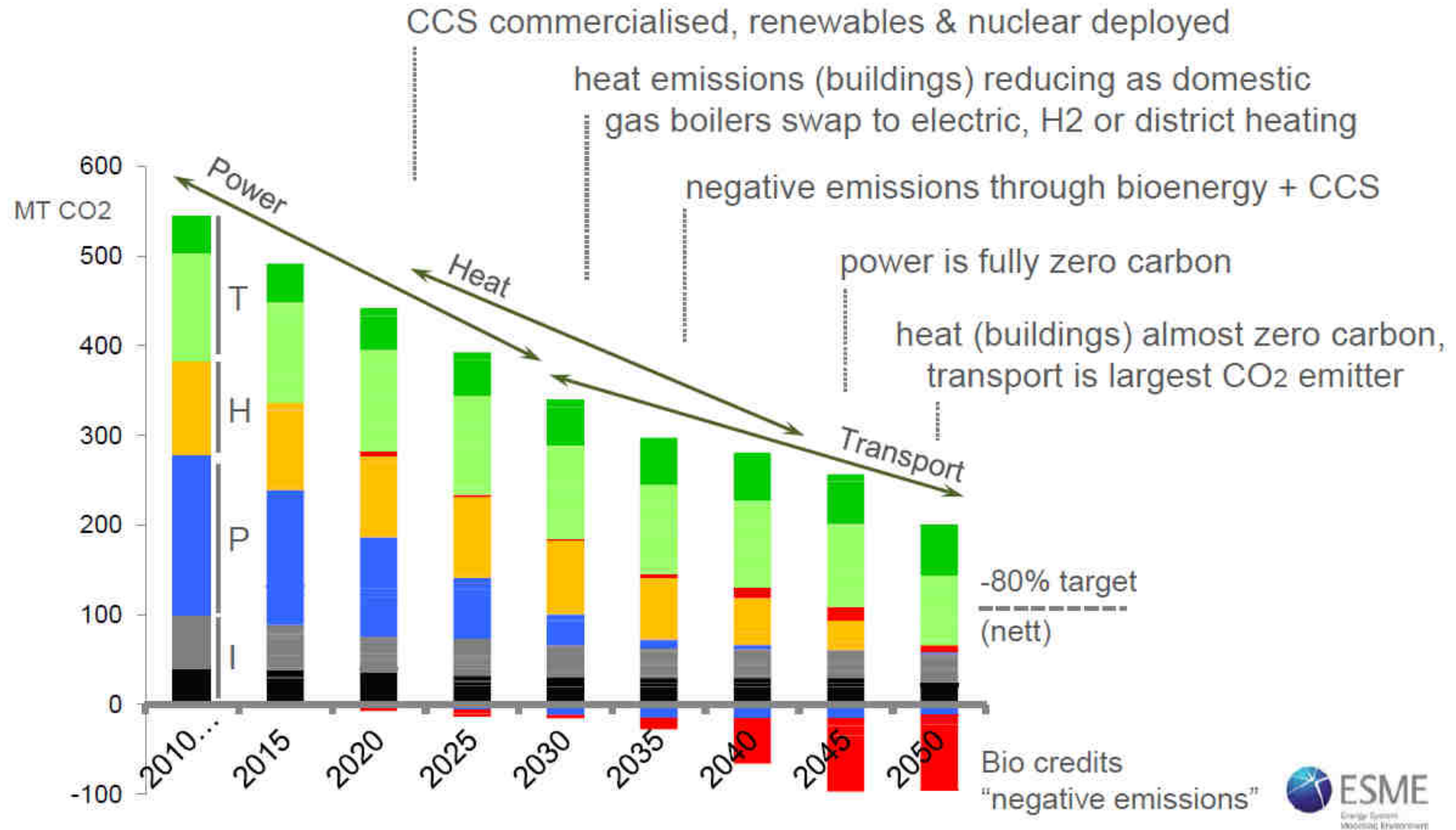
## Additional cost of delivering 2050 -80% CO2 energy system

NPV £ bn 2010-2050



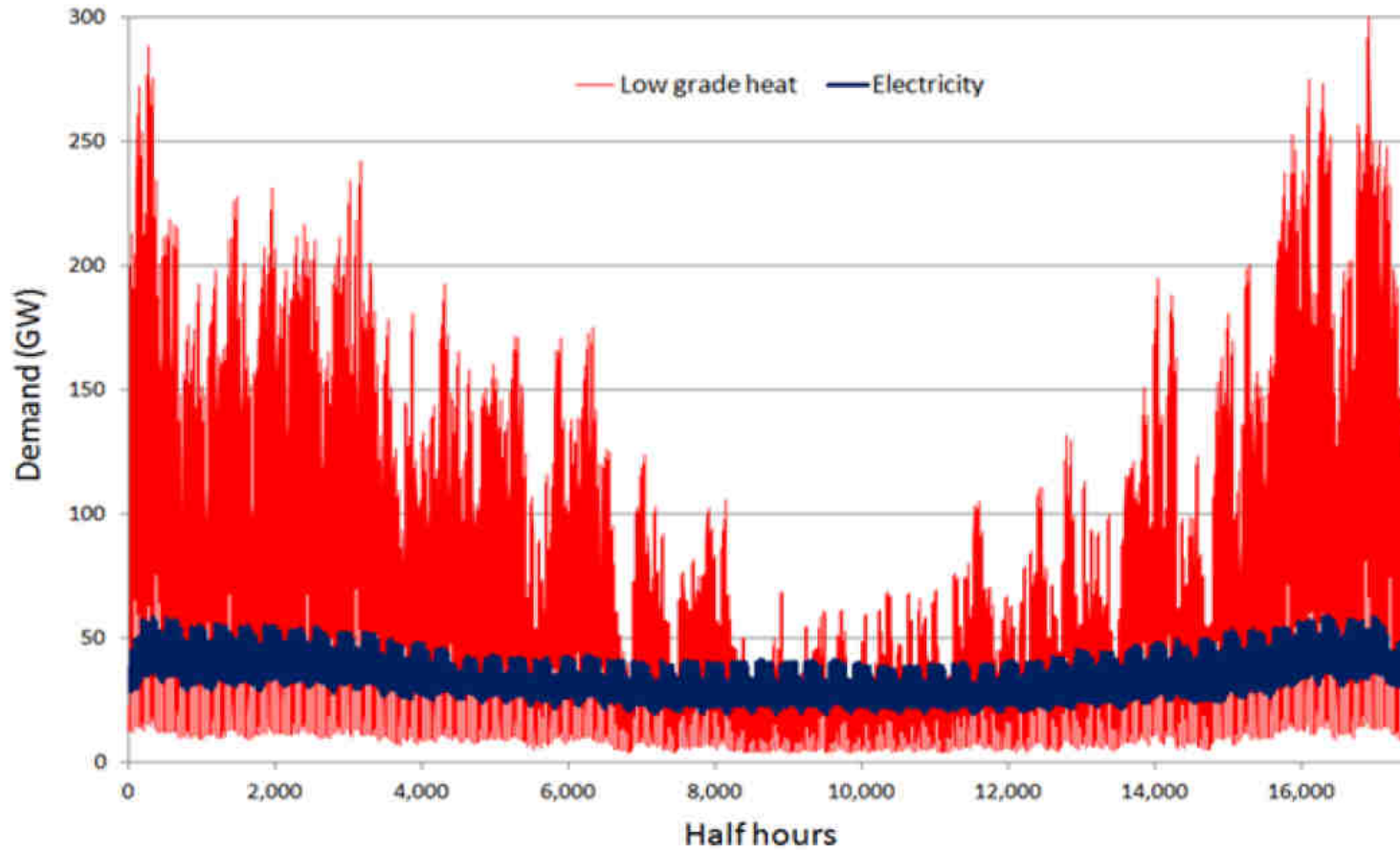


# ESME System – one route to meeting 80% CO<sub>2</sub> reduction for the UK – cost optimal





# ESME System

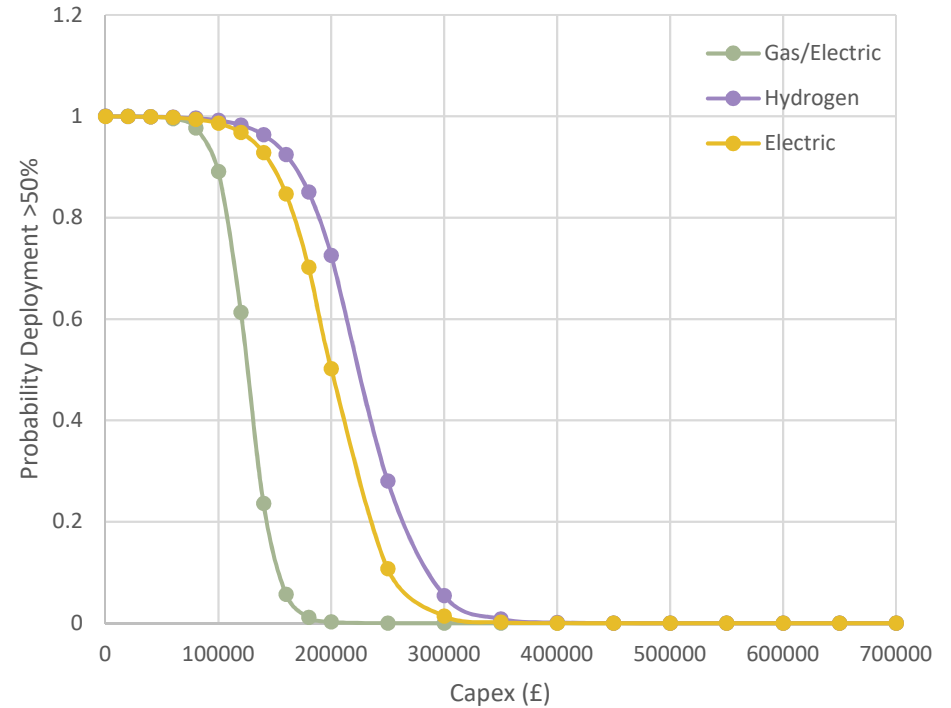
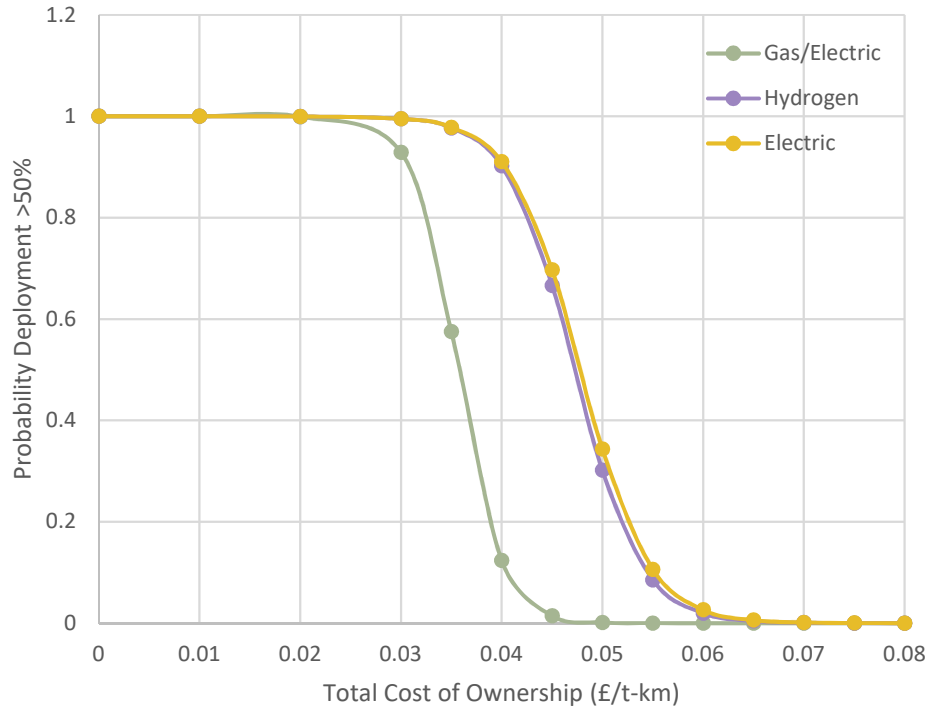


GB 2010 heat and electricity hourly demand variability - commercial & domestic

Data source: UKERC (2011)



# 2050 >33t Articulated HGV - Old

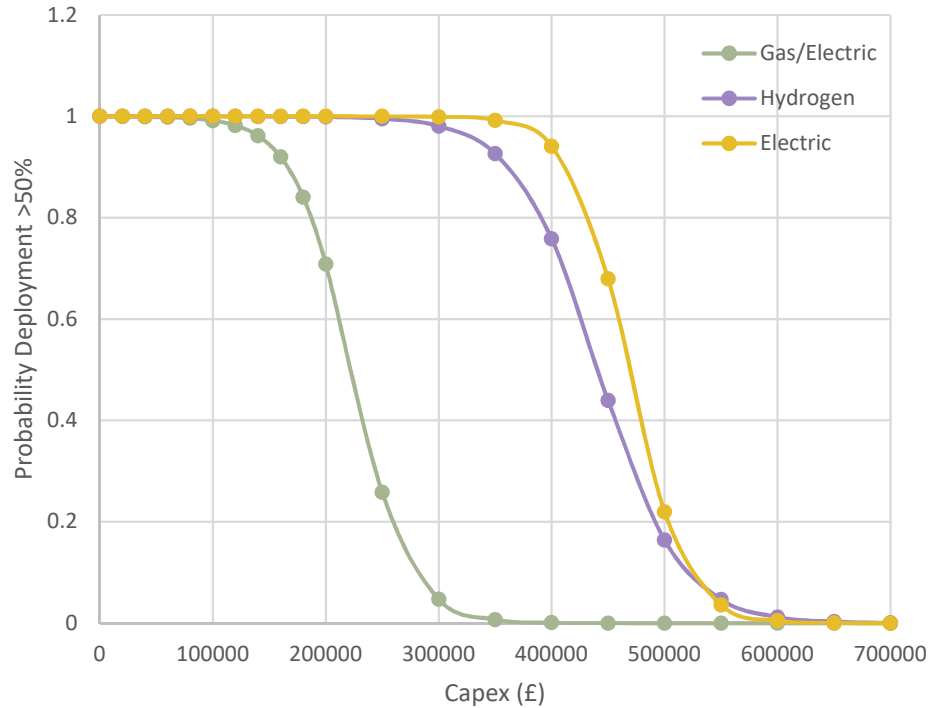
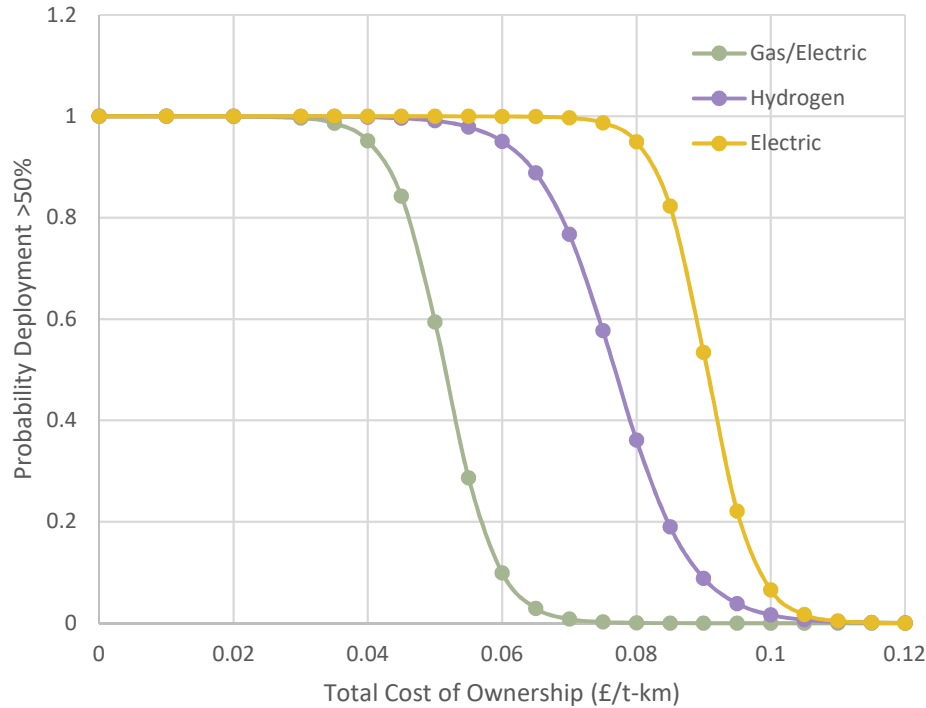


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Gas/electric = 0.02kgCO<sub>2</sub>/t-km



# 2050 >33t Articulated HGV - No CCS - Old



$$TCO_{2050,i} = \frac{(Annualisation\ Factor \times Scale\ Factor_{2050,i} \times Capex_{2010}) + Fuel\ Cost_{2050,i} + Opex}{Annual\ tonne - km}$$

Gas/electric = 0.02kgCO<sub>2</sub>/t-km