
10 1

# Improving Energy Efficiency in the CV fleet

LCVs – up to 3.5 tonnes & HCVs over 3.5 tonnes

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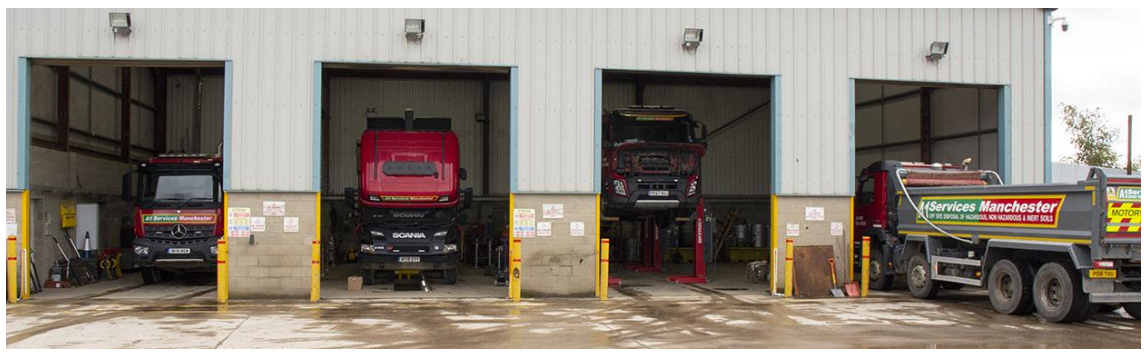
10 2

# Energy Data Management



10 3

# Optimal maintenance




- Identify issues causing high fuel consumption
- Lubricant oil reduces friction
- Engine management software is critical to the performance



10 4

## “Right-sizing” the fleet – cost and kWh

| Make & Model (2023) | Class | Fuel | Average mpg | £/mile fuel | kWh/km | List Price ex VAT |
|---|---|---|---|---|---|---|
| Fiesta 1.0 mHEV | I | Petrol | 57 | £0.090 | 0.4716 | £17,265 |
| Transit Connect L1H1 | II | Diesel | 60 | £0.104 | 0.4994 | £22,000 |
| Transit Custom L1H1 | II | Diesel | 42 | £0.149 | 0.7134 | £28,995 |
| Transit 310 L2H2 | III | Diesel | 32 | £0.195 | 0.9363 | £38,735 |

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10 5

## On-site Van Inspection

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10 6

## Where did the fuel go?


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10 7

## In HCV fleets a wide range of energy uses


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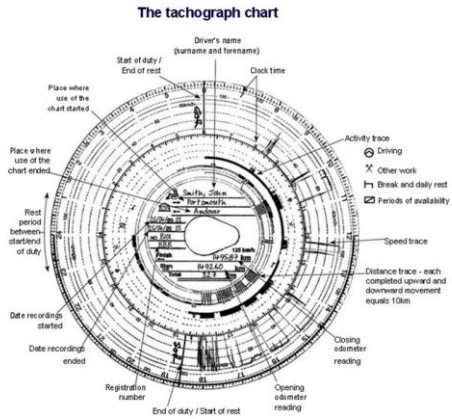
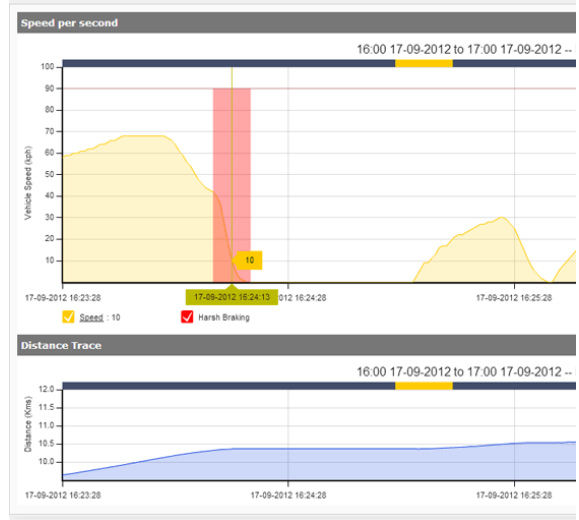
10 8

# In HGV fleets use the Tachograph - DCRS

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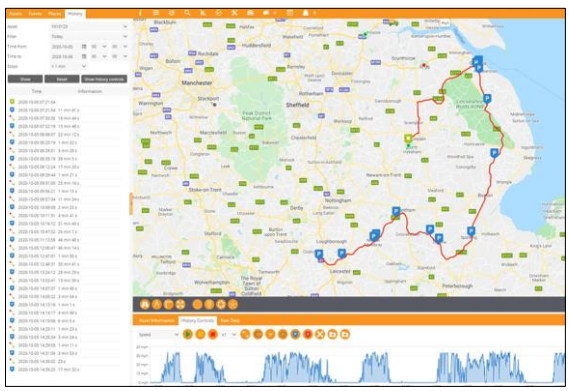
# Making full use of Tracking & Telemetry

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# Reward your best drivers – not just mpg


- Drivers – 40% between best and worst!
- Mpg is a simple metric but kWh/km needed
- Can include “soft” customer-linked metrics

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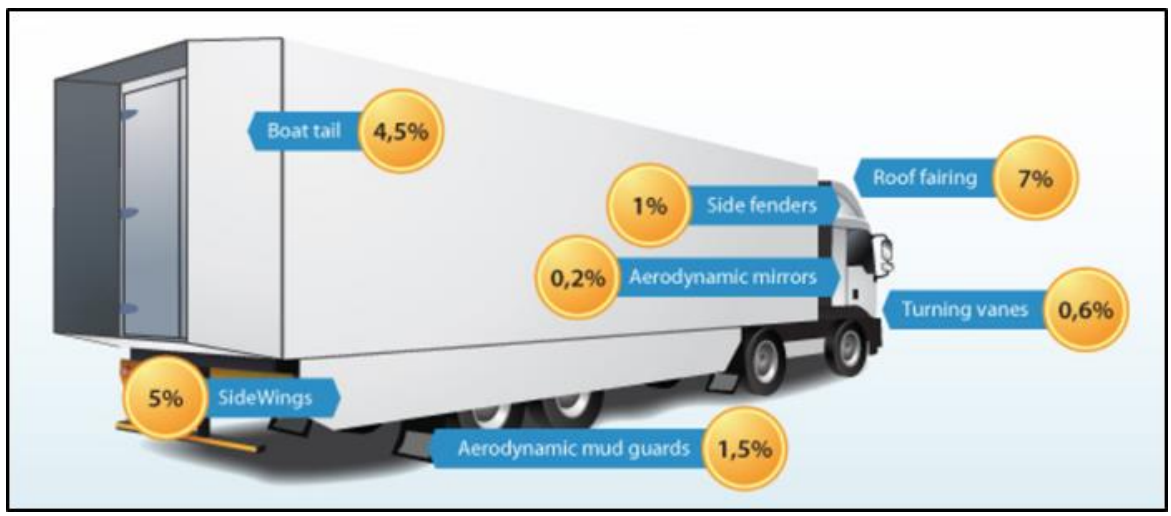
10 11

# Streamlining – only works at speed!




European Platform for Aerodynamic Road Transport

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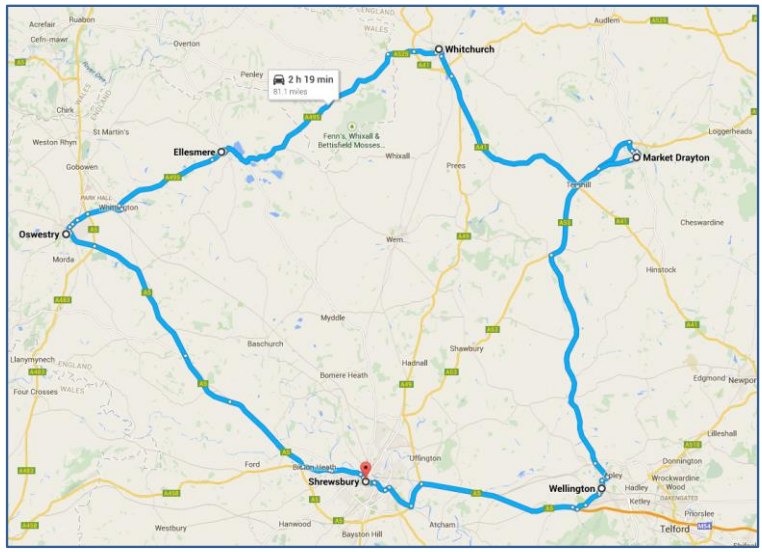
10 12

# Route Optimisation – work with customers




- Shrewsbury, Shropshire, UK
- Oswestry, Shropshire, UK
- Market Drayton, Shropshire, UK
- Whitchurch, Shropshire, UK
- Wellington, Telford and Wrekin, UK
- Ellesmere, Shropshire, UK
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# Tyre Pressures & Wheel Alignment

- Use tyre labels and classifications to find tyres with low rolling resistance
- Under-inflated tyres will increase rolling resistance and fuel consumption.
- Axle misalignment creates significantly higher rolling resistance

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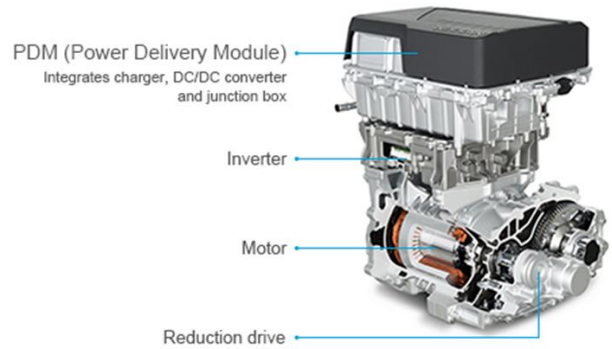
# Beyond “Best Practice” Recommendations

- Limit to energy savings from incremental improvements in ICE performance
- Law of diminishing returns applies – savings are not cumulative!
- Only way to make big savings is to change technology or fuel…

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# The Internal Combustion Engine


**Lose up to 60% in the engine & 10-20% in transmission = 30-40 kWh output to road**

**Business vectors created by macrovector - www.freepik.com**
**Other Images** VW: Battery or fuel cell? That is the question

- A 100 litre tank has about 1000 kWh of stored energy
- But only 30% to 40% of that energy will end up propelling the vehicle
- The other 60% to 70% will be wasted – mostly as heat and noise

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# Battery Electric Vehicles (BEVs)


Business vectors created by macrovector - www.freepik.com
Other Images VW: Battery or fuel cell? That is the question

- Even with T&D loss, over 80% of the energy generated is delivered to the road.
- This results in a real-world cost saving for the “fuel” when compared with diesel.
- Generate your own electricity (£0.05/kWh) and then “fuel” saving can be large.
- Possible to achieve a 70% energy saving using BEVs.

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# Exeter City Council RCV Depot – Live 2022

1.2 MWp of solar PV generation on old landfill, private wire to 2MW battery storage and Kempower Satellite DC charging System for eRCVs (installed by mer/Statkraft).

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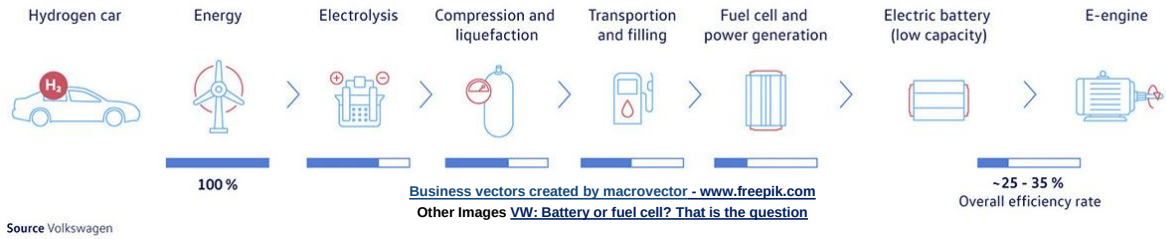
# Hydrogen Fuel Cell (H2FC) Vehicles




Business vectors created by macrovector - www.freepik.com
Other Images VW: Battery or fuel cell? That is the question

Source Volkswagen

- At least 65% of the renewable energy lost between generation & the road (VW).
- This is similar to the ICE – but half the loss is between generation and the "pump"
- If made on-site all the issues of grid constraint apply – also impacts BEVs.
- At Exeter CC would have required a PV array three times as big to make and use H2.

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# Volvo are already in the 44t BEV market


Volvo FM electric (battery) – 100 ordered by DFDS – first deliveries made (30)

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# Scania 66 tonne BE truck – Norway Quarry


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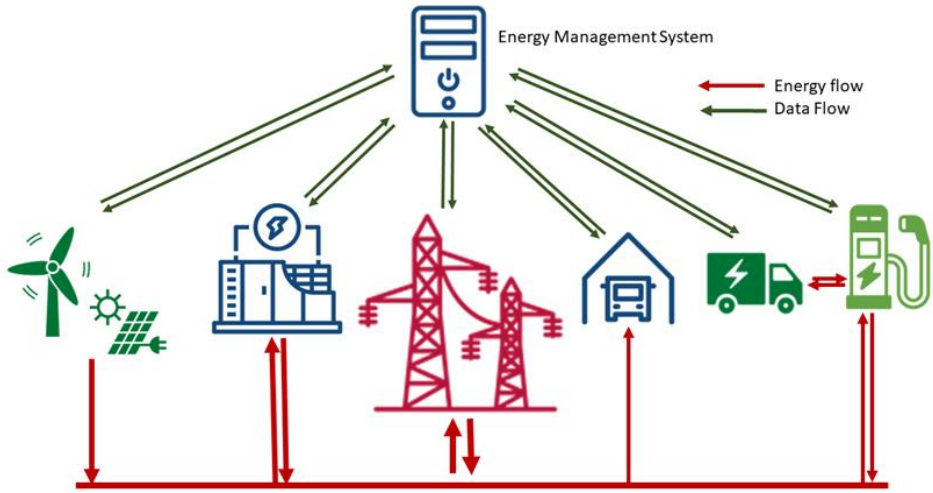
# Implementing BEVs – Integrated with sites

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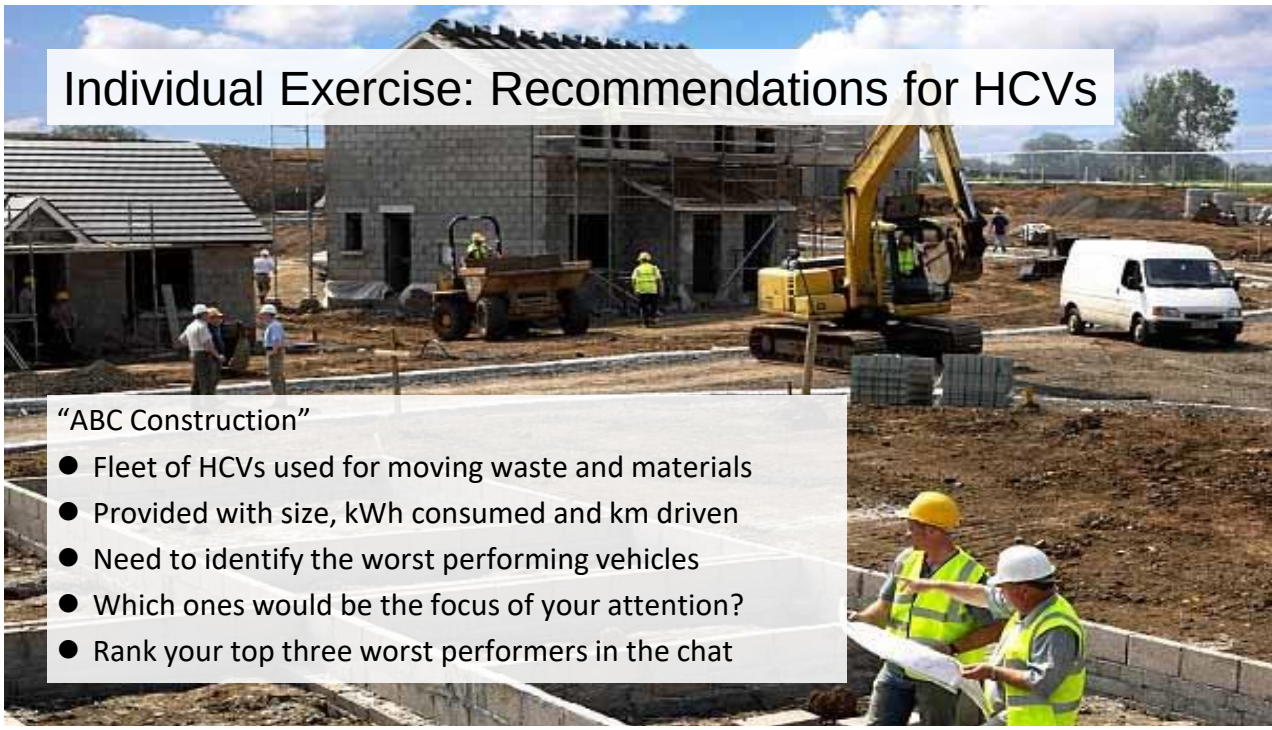

## Individual Exercise: Recommendations for HCVs

"ABC Construction"

- Fleet of HCVs used for moving waste and materials
- Provided with size, kWh consumed and km driven
- Need to identify the worst performing vehicles
- Which ones would be the focus of your attention?
- Rank your top three worst performers in the chat

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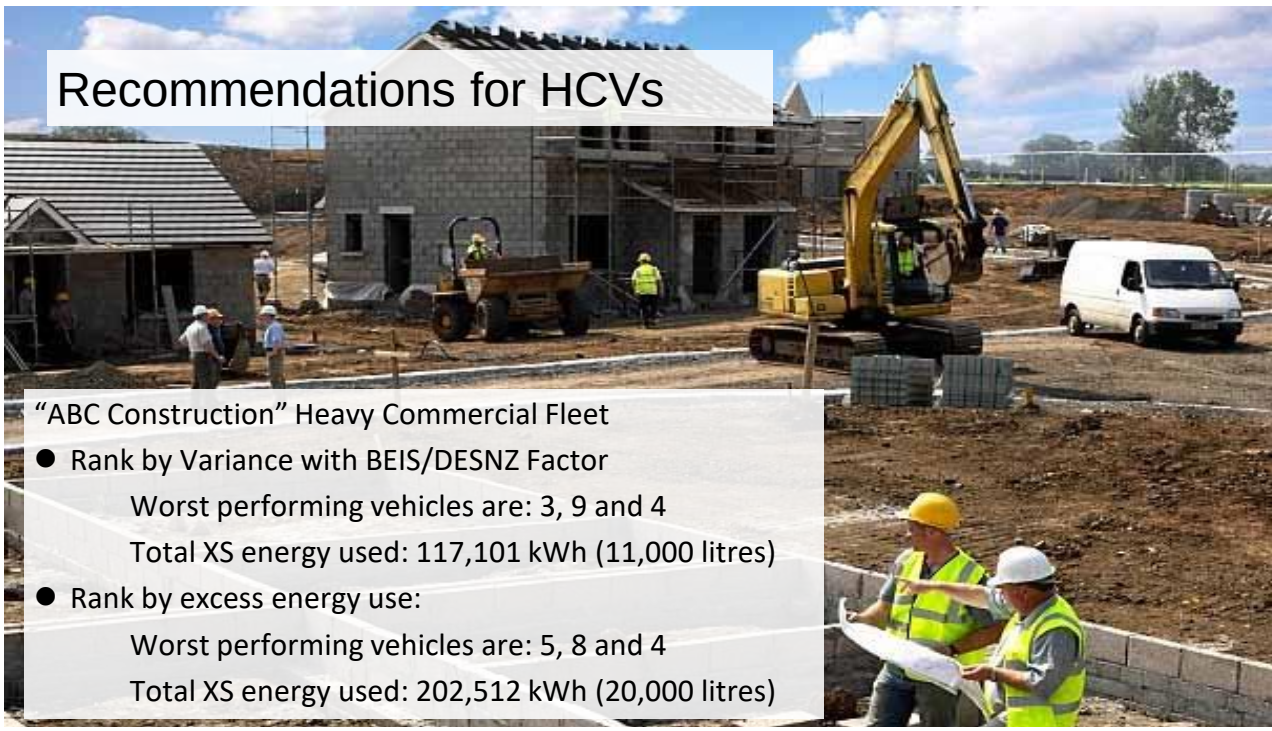

## Recommendations for HCVs

"ABC Construction" Heavy Commercial Fleet

- Rank by Variance with BEIS/DESNZ Factor
  - Worst performing vehicles are: 3, 9 and 4
  - Total XS energy used: 117,101 kWh (11,000 litres)
- Rank by excess energy use:
  - Worst performing vehicles are: 5, 8 and 4
  - Total XS energy used: 202,512 kWh (20,000 litres)

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