

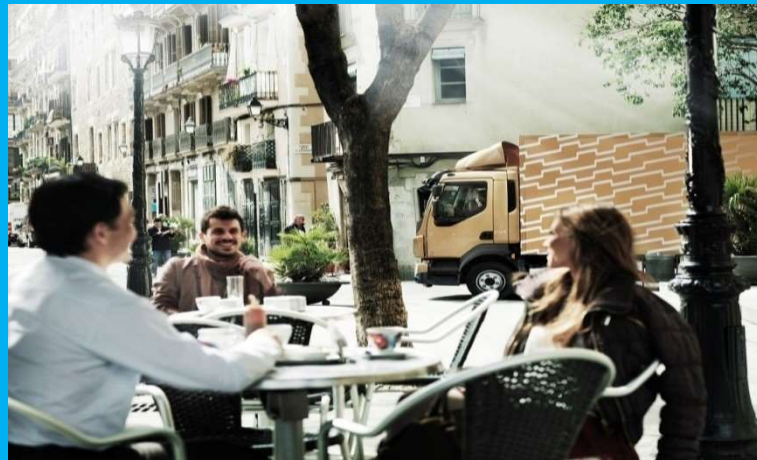
PESTLE 2018



Future Demands

Drivers for Change

- Political
- Environment
- Social
- Safety
- Legal
- Efficiency



Technology

- Energy conservation and improved utilisation
- Telematics
- Alternative fuels
- Renewables - Less demand on fossil based fuels
- Connectivity
- Electrification
- Automation



Challenges

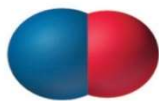
- Public & Political opinion
 - ✓ Congestion
 - ✓ Air Quality
 - ✓ Ultra Low Emission zone
 - ✓ Clean air zone
 - ✓ Carbon reduction
 - ✓ Noise
 - ✓ Safety
- Increased goods flow
 - ✓ Urbanization / e-commerce
- Stricter/Scattered Regulation
 - ✓ Access restrictions
- Driver shortage



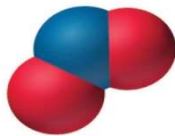
Air Quality, Carbon Reduction and Noise

Air Quality

- Soot and Oxides of Nitrogen
- Carcinogenic and breathing issue
- For Trucks Euro VI ultra low or clean air emission zones



NO



NO₂



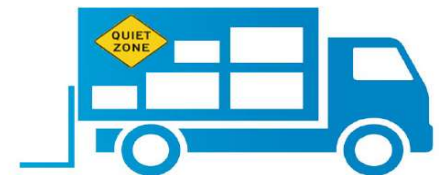
Carbon Reduction

- Greenhouse gas emissions
 - Carbon dioxide
 - Methane
 - Nitrogen dioxide
- Use less fuel



Noise

- 24 hour delivery ?



The Vision for Air Quality in London

LEZ Low Emission Zone and ULEZ Ultralow Emission Zone



Past Particulates Matter Control of PM

2008 - Euro 3
PM levels

2012 - Euro 4/5
PM levels

24hours a day.
Every day including
weekends, public and
bank holidays.



Present - Consultation on ULEZ

- Closes 28th February 2018
- Focus on NOx
- Euro VI minimum standard for trucks



Phased approach to ULEZ

- April 2019 Congestion Charge Zone for all modes of transport
- October 2020 ULEZ moves to today's LEZ area – for trucks and coaches the M25
- October 2021 wider central zone for cars, vans and motorbikes

Future

- The Mayor's Transport Strategy
- Central London and town centre zero emission zones from 2025
- **Zero emission transport by 2050**



Volvo Trucks. Driving Progress

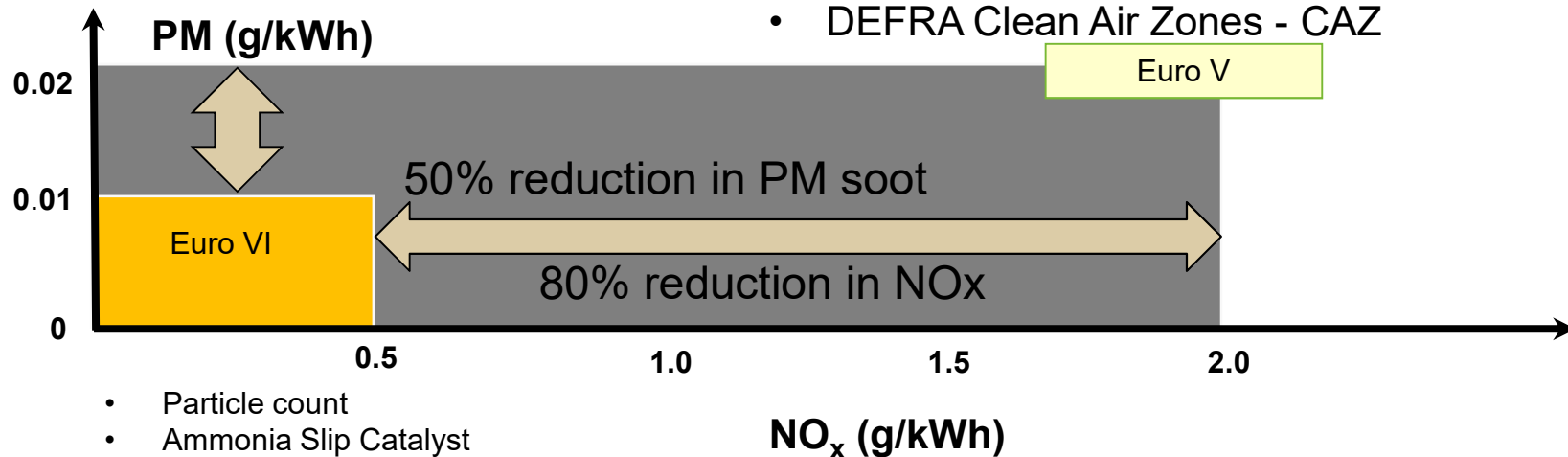


Clean air and ultra low emission zones

How does EuroV to Euro VI measure up?

Euro VI The entry level for

- London Ultra Low Emission Zone - ULEZ
- DEFRA Clean Air Zones - CAZ



- Particle count
- Ammonia Slip Catalyst
- Closed crankcase ventilation
- Seven years - in service compliance



T – Toxic Charge



T-Charge and LEZ			
Vehicle class*	Min emission standard**	or	Daily Charge
	Euro 4		£10
	Euro IV		(CC Hours Only)
	Euro IV PM		£200
	Euro 3 PM		£100

- The Low Emission Zone (LEZ)
 - operates London-wide, 24/7
 - Since 2008, tightened 2012
 - Has saved 28t of particulate matter
- The T-Charge
 - covers the CC zone and hours
 - A 28 percent reduction in non-compliant vehicles entering the CCZ

- Same boundary and times as Congestion Charge
- Similar exemptions to Congestion Charge, except 9+ seaters (not exempt), historic & and showman’s vehicles (exempt/100% discount, like ULEZ). Blue badge holders get a 100% discount like Congestion Charge.
- £10 surcharge (on top of the Congestion Charge)
- Charge will apply to all eligible pre-Euro 4 vehicles (broadly equivalent to vehicles from 2005 and older)
- An important stepping stone towards the Ultra Low Emission Zone (ULEZ).

Ultra Low Emission Zone 2019

Implementation date 8th April 2019



2019 - Confirmed



ULEZ replaces T-Charge. Introduction of Euro 6/VI diesel standard and change in charge and hours

Vehicle class*	Min emission standard** or	Daily Charge
	Euro 3	£12.50
	Euro 4 petrol or Euro 5 diesel	£12.50
	Euro VI	£100
	Euro IV PM	£200
	Euro 3 PM	£100

- In 2019 the Ultra Low Emission Zone (ULEZ) will replace the T-Charge in central London and operate 24/7
- Expected to save 20 percent of road transport NOx in 2019 in central London

- ULEZ replaces T-Charge. Introduction of Euro 6/VI diesel standard and change in charge and hours

Does my vehicle comply?
[Click Here](#)

2020 – Proposed expansion for trucks out to current LEZ

Implementation date 26th October 2020



2020 Proposal



Euro VI standard applies London-wide for heavy vehicles			
Vehicle class*	Min emission standard**	or	Daily Charge
	Euro 3		£12.50
	Euro 4 petrol or Euro 6 diesel		£12.50
	Euro VI		£100
	Euro IV PM		£300
	Euro 3 PM		£100

- 2020: to tighten LEZ standards to a Euro VI requirement for heavy vehicles
- Expected to reduce NOx emissions by 19 per cent London-wide

Euro VI standard applies London-wide for heavy vehicles

- ULEZ boundary expanded for trucks, coaches and older vans
- The boundary extends out to the M25
- Need to consider recovery of Volvo customers in to a London based Volvo dealer
- Euro VI Truck required for free entry in to the wider zone



2021 – Proposed new zone for cars, bikes and vans

Implementation date 25th October 2021



2021 Proposal



ULEZ expands to inner London		
Vehicle class*	Min emission standard**	or Daily Charge
	Euro 3	£12.50
	Euro 4 petrol or Euro 6 diesel	£12.50
	Euro VI Euro IV PM	£100 £300
	Euro 3 PM	£100

Note: In the hatched areas, standards indicated by both colours apply.
 *Vehicle class is indicative only, additional vehicles are affected
 **Minimum emissions standard is for NOx and PM unless otherwise stated

- 2021: to expand the ULEZ so that all vehicles entering inner London are subject to emissions controls from this date forward
- Impact of London-wide heavy and inner expansion for lights is expected to reduce NOx emissions by 28 per cent London-wide

- New boundary of North and South Circular for motorbikes, cars and vans with the relative minimum emission level shown in the table.
- No changes in boundaries or minimum emission levels for trucks.

Is there an upgrade for Euro V vehicles? **NO**

2019 No retrofit for Euro V to reduce Nox

- Big effect on used truck and coach
- And customers currently using Euro V

A special test cycle to prove emissions by TFL for buses



TfL have a standard which uses the Millbrook chassis dyno to measure the emissions on a London bus cycle which are roughly in line with Euro VI



So we can sell older trucks elsewhere?

DEFRA



CAZs

Overview

This consultation seeks views on the implementation of Clean Air Zones in England. A cleaner, healthier environment benefits people and the economy. Our ambition is for the UK to have some of the very best air quality in the world and Clean Air Zones are designed to help us deliver this.

In the national air quality plan for nitrogen dioxide, published in December 2015, Government committed to consulting on the draft framework for Clean Air Zones in 2016. The plan also set out that the Government would require the implementation of Clean Air Zones in five cities (Birmingham, Derby, Leeds, Nottingham, Southampton).

Closes 9 Dec 2016
Opened 13 Oct 2016

Contact
03459 335577
air.quality@defra.gsi.gov.uk

Volvo Trucks. Driving Progress



DEFRA Clean Air Zones CAZs

The effective zone?

- Will this be only specific parts (ward) of each city council area or the whole?
NB [Southampton City Council](#) aim to introduce penalty charges in 2020 and the proposed CAZ will include the city centre and the main arterial routes within the administrative boundary.
- For HGVs does this mean the whole of Southampton City Council boundary?

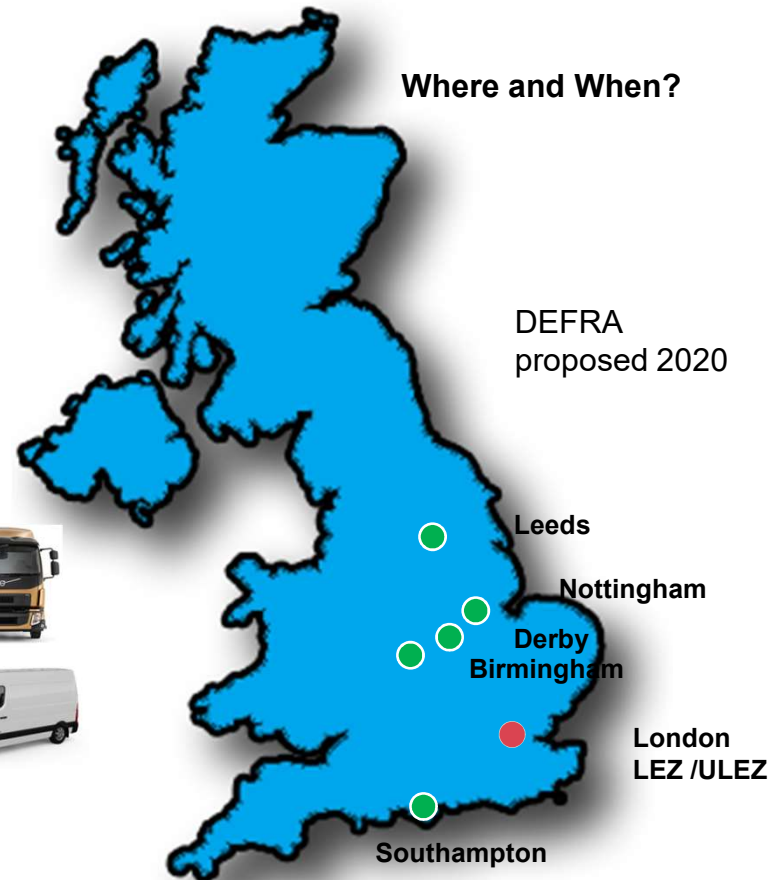
What vehicles can enter?

HGV **Euro VI** emission standard for free entry into the DEFRA CAZs.

Leeds and Birmingham would also need to included light CVs (vans) Euro 6 or Euro 4 petrol.

What is the Cost of entry – if not compliant?

London ULEZ	= £100/day
DEFRA CAZs	= probably as London ?



Client Earth – Judicial review



ClientEarth air quality lawyer Alan Andrews added:

- “We need a national network of clean air zones to be in place by **2018** in cities across the UK, **not just in a handful of cities.**”
- The government also needs to stop these inaccurate modelling forecasts. Future projections of compliance need to be based on what is really coming out of the exhausts of diesel cars when driving on the road, not just the results of discredited laboratory tests.”


CAN WE TRUST THE AUTOMOTIVE INDUSTRY

Theresa May indicated that the government would respond positively, with new proposals: “We now recognise that Defra has to look at the judgement made by the courts and we now have to look again at the proposals we will bring forward. Nobody in this house doubts the importance of the issue of air quality. We have taken action, there is more to do and we will do it.”




DfT Freight Carbon Review 2030

Highlights efficiency savings and alternative fuels




Alternative Fuels

- Natural Gas
- Biofuels




Efficiency Savings

- Eco driving
- Intelligent technology – platooning
- Fleet design – aerodynamics



Modal Shift

- Rail – capacity and cost
- Water – coastal and inland




Electric Power Vehicles

- Wireless power transfer in Roads
- Electric powered large HGVs
- Hydrogen Cell



Logistics

- Distribution centres
- Coordination
- Congestion



Final Mile

- Battery Electric Vehicles
- Failed Delivery reduction

The DfT highlights the key areas of efficiency savings and Alternative fuels.

In this section the focus is on electrification and how that could work in terms of the distribution cycle.



National Air Quality Demands

February 2019 new Levy rates

This measure changes the HGV levy which is currently up to £10 a day or £1,000 a year, depending on the vehicle's size and weight. In future the levy will also depend on vehicle emissions. The newest lorries generate 80% less nitrogen oxide (NOx) emissions than older ones, so from 1 February next year, lorries meeting the latest Euro VI emissions standards will be eligible for a 10% reduction in the cost of the HGV levy.

Note that those lorries that don't meet the latest emissions standards will be expected to pay 20% more, except where the levy is already set at its maximum rate allowable under European legislation.

This measure is being used to reduce the rates for Euro VI vehicles as The [HGV Road User Levy Act](#) allows for rates to be reduced (but not increased) through secondary regulations. Primary legislation is required for any raising of rates. That aspect of the changes will be done via the Finance Bill 2018.



EU's Energy and Climate Policy framework for 2030

- 30% CO₂ emissions reduction from transport 2005–2030
- Strategy for low emission mobility
- CO₂ regulations for trucks
- White paper to achieve a 60 % reduction in CO₂ emissions and comparable reduction in oil dependency.

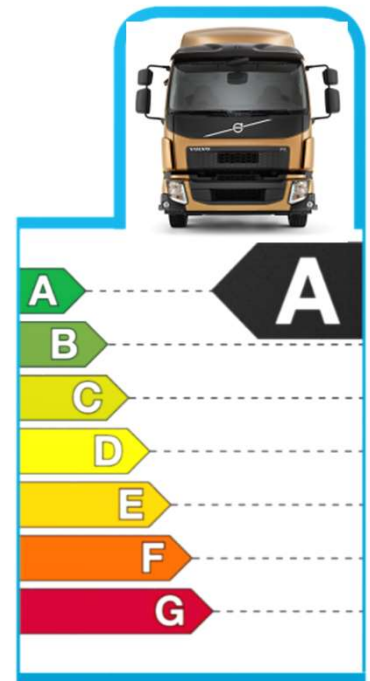


Future – VECTO 2018



certified, reported and monitored

Vehicle Energy consumption Calculation Tool – VECTO



The Diesel Fleet



Diesel - EURO VI

Energy Efficiency

Improving the existing fleet



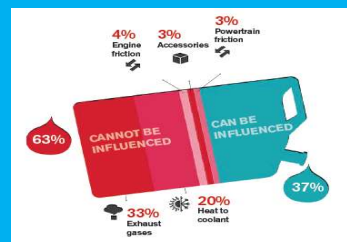
Volvo Trucks. Driving Progress



Fuel Management

Getting the most from every litre

- Driver behaviour
- Measuring and managing
- Driver training
- Reduced Idling
- Understanding the losses
- Improved aerodynamics
- Reduction in key system losses
- Planned Maintenance
- Planning
- Utilisation



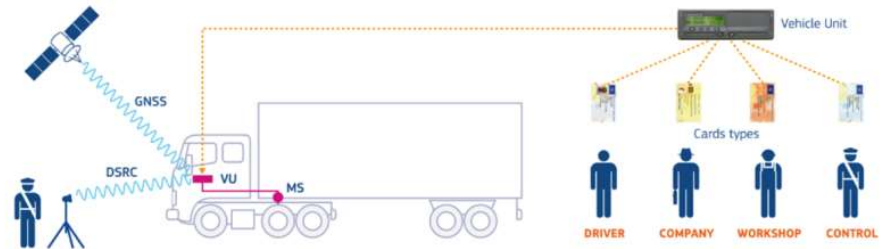
GDPR and Smart Tachograph

**Smart Tacho
15th June 2019**



**GDPR
Compliance
28th May 2018**

1. Driver agreements in place



1. Automated recording of precise location
2. Roadside interrogation of the tachograph
3. Intelligent transport systems

Energy Management & Energy Sizing

Crucial with Alternative Fuels

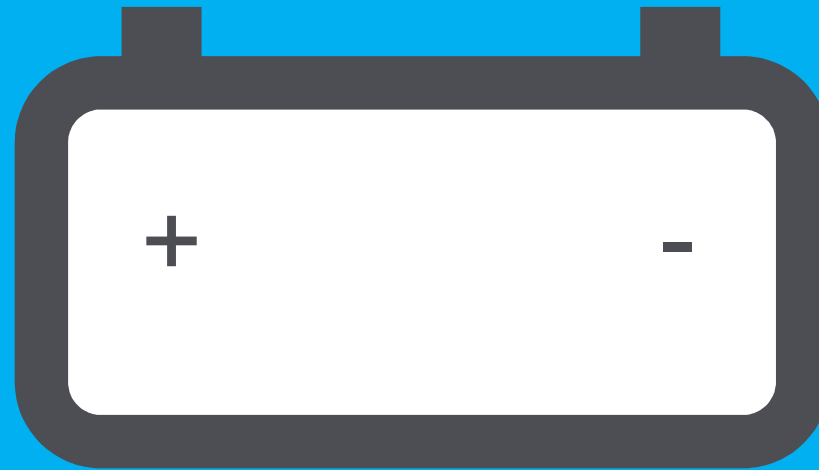


VECTO

MPG after the event

Established network diesel network

Fuel tank size – up to 1500litres



Hp to kW

Is range an issue?

Refuelling?

Defining the energy on the route – prior to event?
Electric fuel tank cost



Selecting the Right Alternative

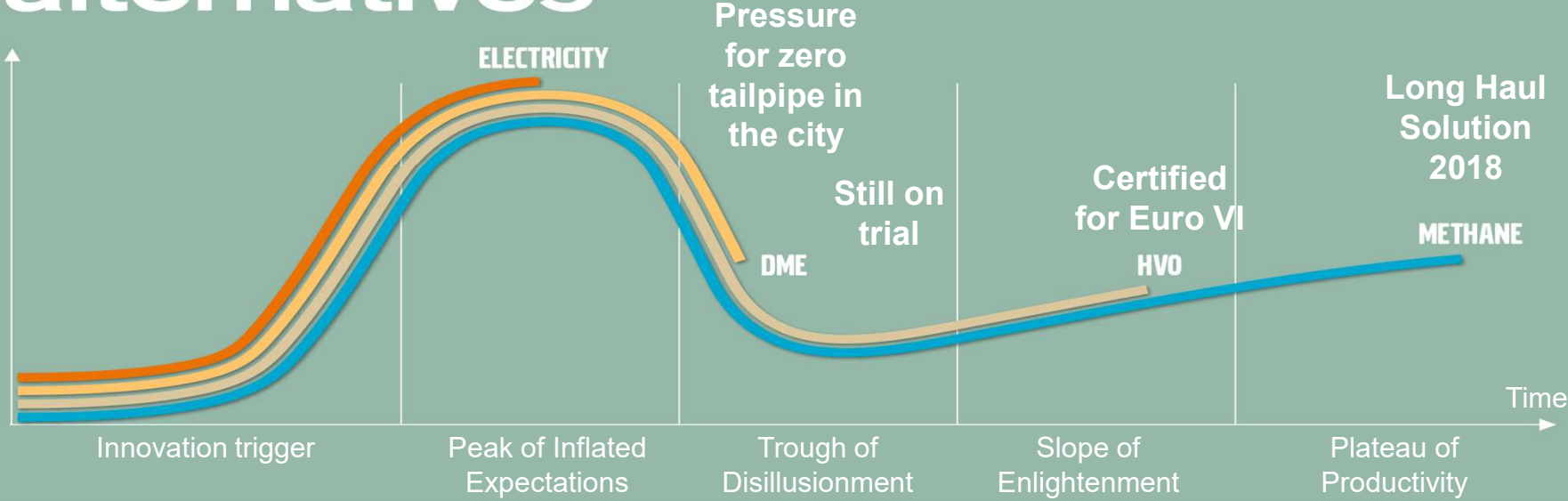


Alternative fuels



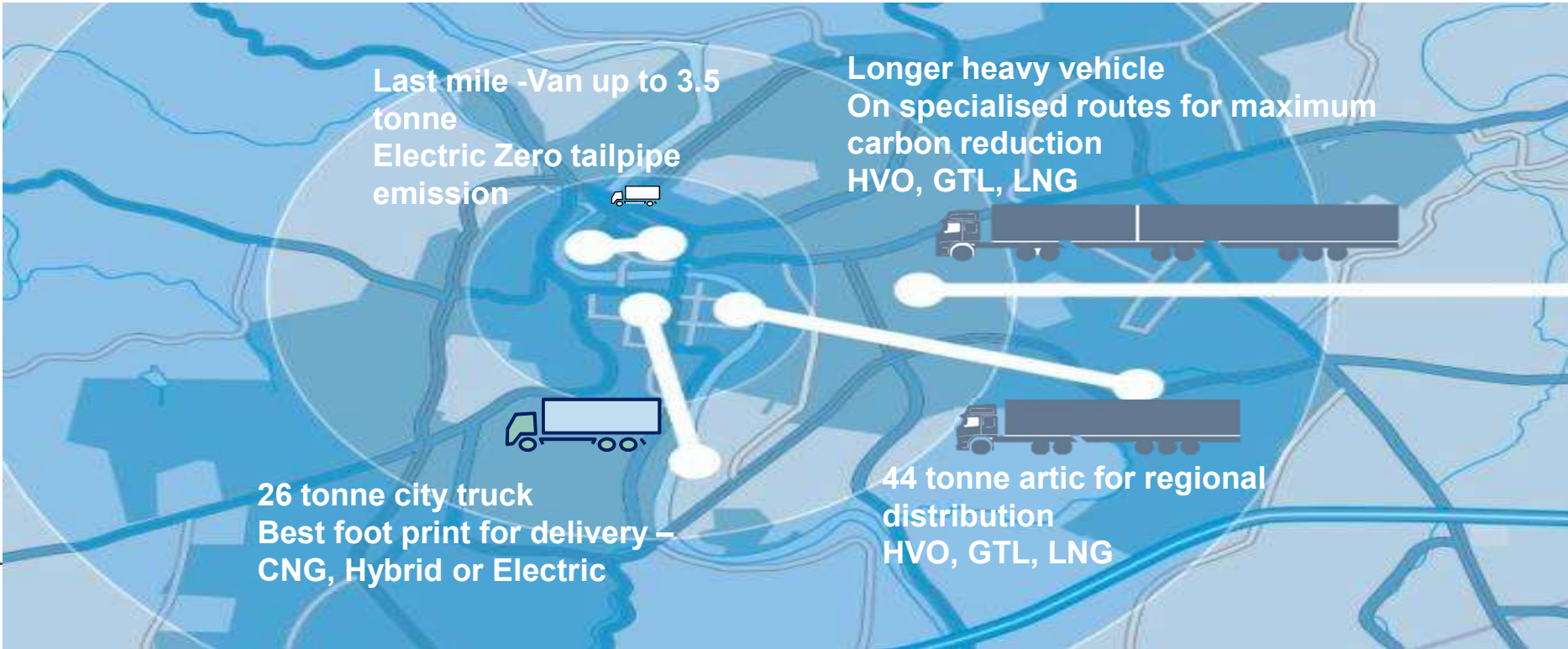
Selecting the Right Alternative

Today's most promising alternatives



Selecting the Right Alternative

Choosing the right Alternative – Long haul, regional or city distribution



Making it work

PLANET



PERFORMANCE



PROFIT



Synthetic Diesel EN15940

HVO
GTL



Compressed Natural Gas

- SPARK IGNITION ENGINE FOR EURO VI COMPLIANCE
- VOLVO G9K320 320HP AND 1356NM
- 8.9 LITRES DISPLACEMENT
- AUTOMATIC GEARBOX ONLY
- 1000 HOURS BETWEEN EACH ENGINE DRAIN
- CARBON REDUCTION UPTO 20%
- BIOGAS SAVING 70% WELL TO WHEEL
- EXHAUST 3 WAY CATALYST
- RANGE UP TO 300KM WITH 8 GAS TANKS
- AVAILABLE AT 18 OR 26 TONNE



**SPARK IGNITION
ENGINE NO
REGENERATION
AND NOADBLUE**

Volvo FE 320 18 tonne rigid



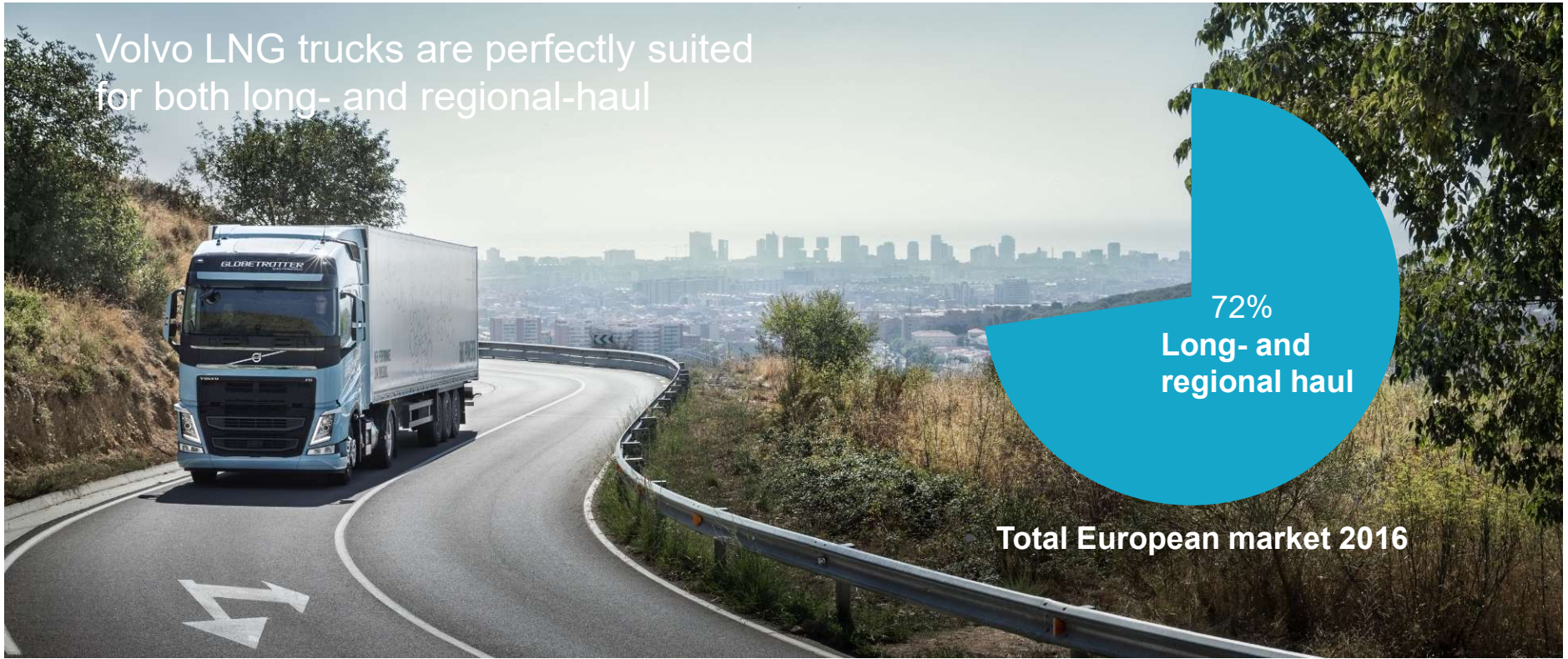
Volvo FE 320 26 tonne rigid

Volvo Trucks. Driving Progress



LNG European Market Long & Regional Haul

Volvo LNG trucks are perfectly suited for both long- and regional-haul



Liquid Natural Gas Headlines

Diesel Substitution Factor

90–95% LNG

Each injection contains a fuel mixture of approximately 90%–95% LNG and 5%–10% diesel.

**AdBlue Consumption
10–20% LOWER**



Diesel Efficiency

Same Peak Power & Torque

SAME ENGINE BRAKE PERFORMANCE

**CO₂ emissions
20% LOWER**

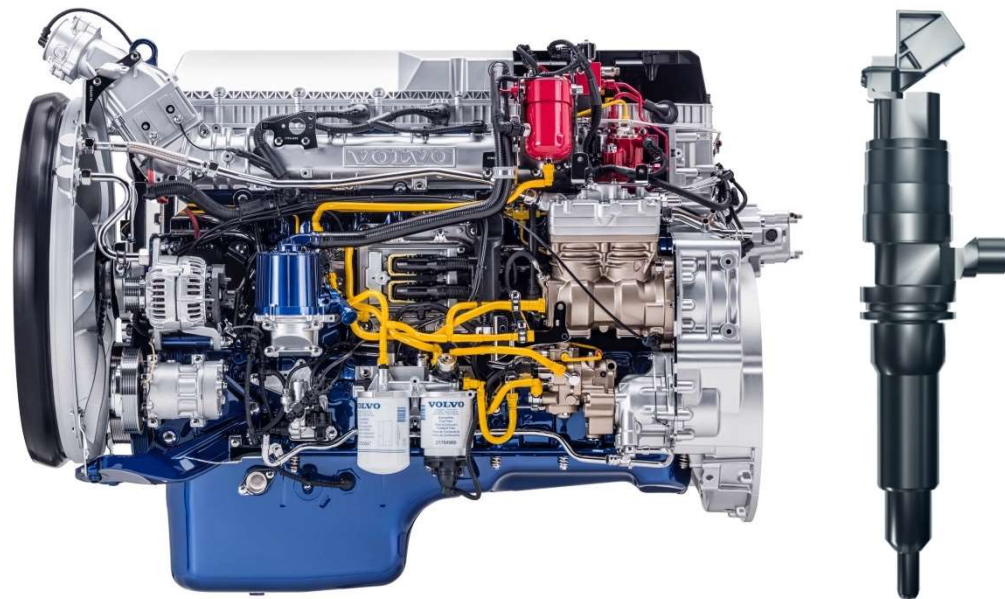
100% lower CO₂ when use of liquefied bio-LNG and Synthetic Diesel (HVO) – tank-to-wheel



The Diesel Cycle

Two fuels are injected via the same injectors: vaporized LNG and a small amount of diesel are injected together

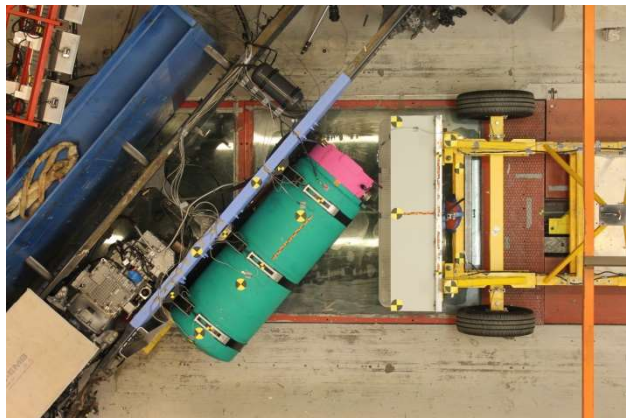
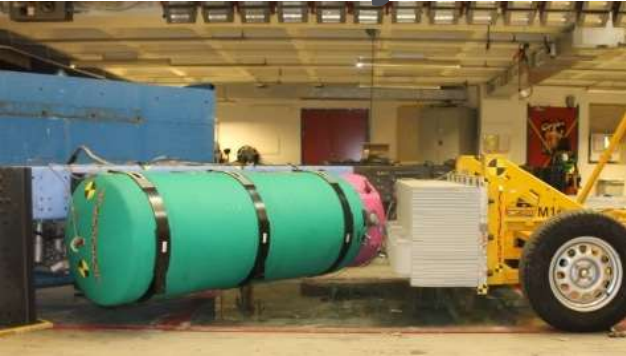
This dual fuel High Pressure Direct Injection technology makes the LNG trucks unique – and enables the power and energy efficiency of a diesel truck with a more sustainable fuel type



LNG Refuelling & Infrastructure



LNG Safety



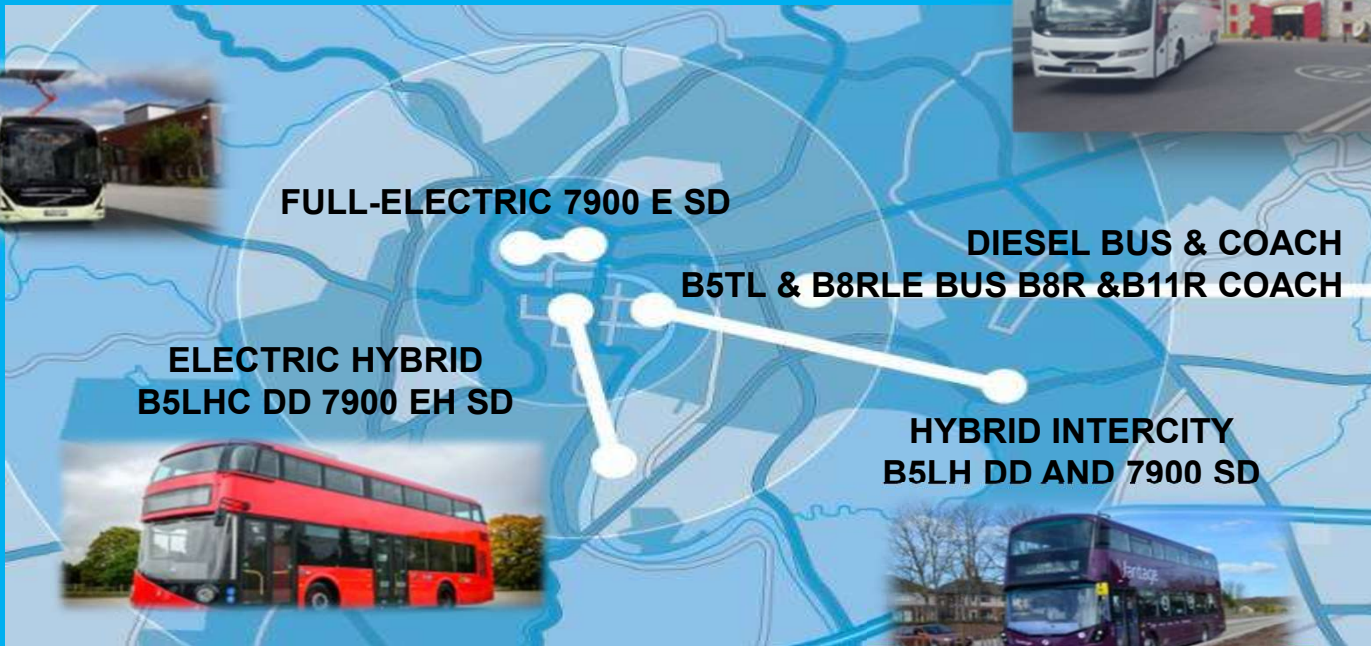
Zero Tailpipe Emission – Co-operation across group

A Volvo Group Effort - Trucks, Buses and Construction Equipment



Zero Tailpipe Emission

A Volvo Group Effort - Electrification driven by Bus



Volvo Trucks. Driving Progress



Utilize platform & shared technology



Increasing awareness in society



- 90% of accidents are due to human error

The Laws of physics –

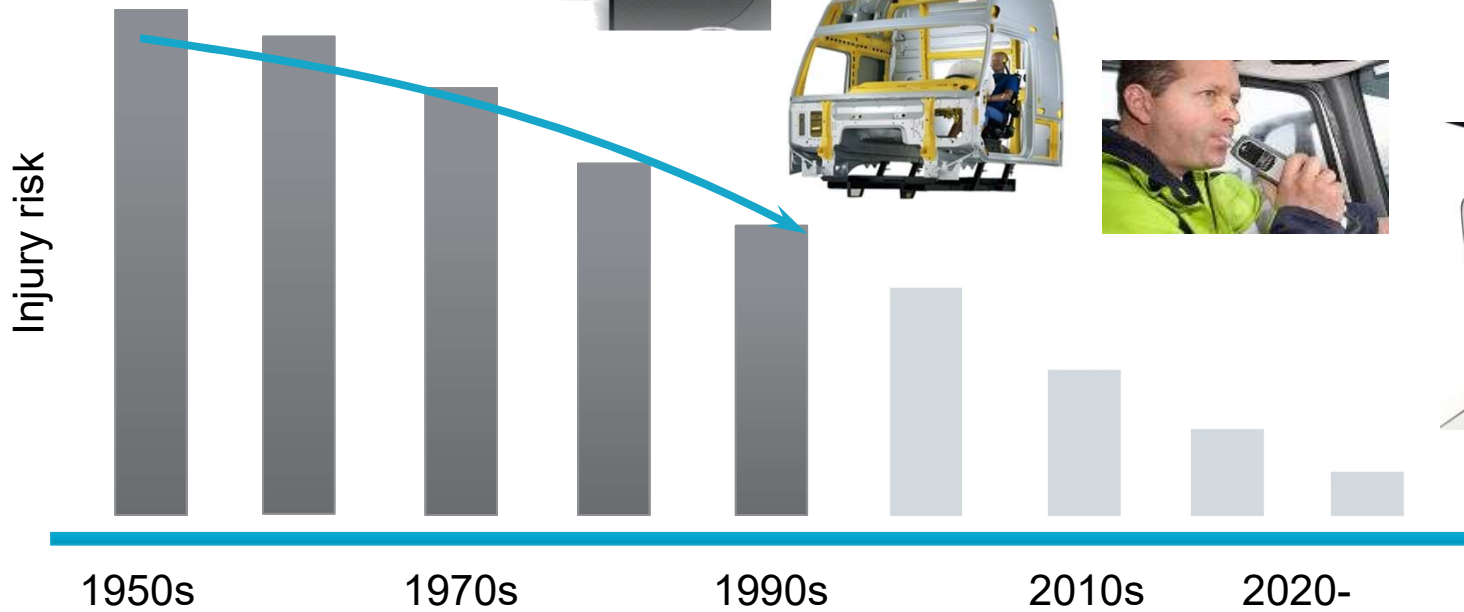
- High cab or low cab a 32tonne truck is still a 32tonne truck
- Education is vital



The passive safety phase



A brand definer
You can sell safety!



Brake Time – 1st November 2018



Legal Demand	Step 1* November 1, 2015	Step 2 November 1, 2018
Stationary “Object”	from 80 km/h (50mph) a reduction of 10 km/h	from 80 km/h (50mph) a reduction of 20 km/h
Moving “Object”	32 km/h: from 80 km/h no impact	12 km/h: from 80 km/h no impact

Advanced Emergency Brake Update

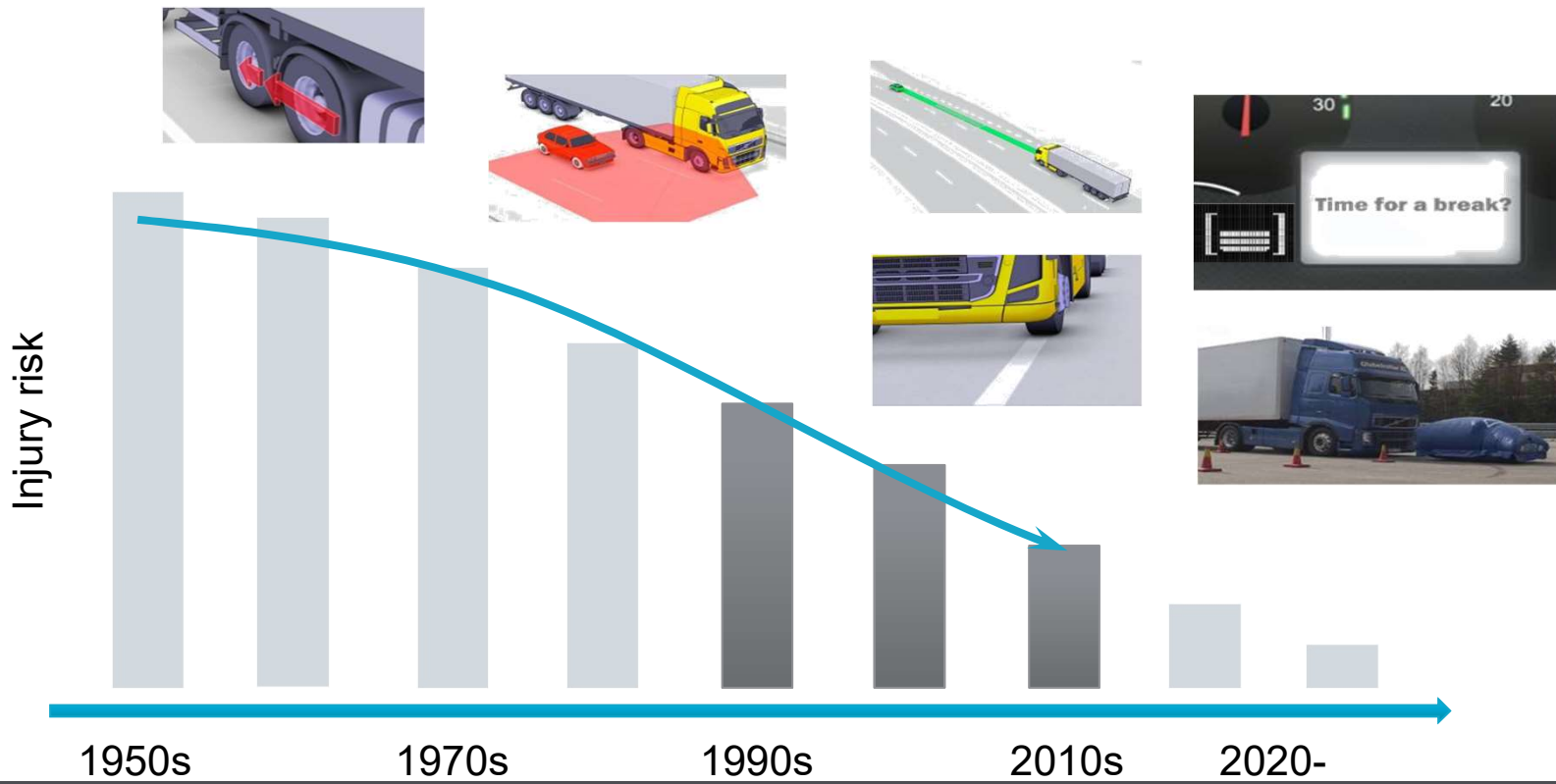
“The aim is to help reduce incidents and hence reduce casualties in which a truck drives into the back of a vehicle in front.”

Legal from 1st November 2015

- Only for vehicles N2,N3 with rear air suspension and maximum three axles
- Four axle trucks and off road defined trucks are exempt



The active safety revolution



Safety - Vulnerable Road Users



DVS CONSULTATION
Interim 1, 2 or 3 star
Needs to be Verified

Volvo Trucks. Driving Progress



The Proposed Direct Vision Standard DVS

For all trucks over 12 tonne GVW.

- On 30 September 2016 the Mayor of London, Sadiq Khan, launched the world's first Direct Vision Standard (DVS) for HGVs.
- It is designed to improve the safety of all road users, particularly vulnerable road users like pedestrians, cyclists and motorcyclists.
- Using a star system, the DVS rates HGVs from 0 (lowest) to 5 (highest), based on how much a truck driver can see directly through the cab windows, as opposed to indirectly through cameras or mirrors.



- In terms of its proposed implementation DVS is to come in two
- **2020** zero star rated trucks no longer allowed in London
 - **2024** only 3 ,4 and 5 star vehicles allowed, 1 and 2 star ratings no longer allowed.

The focus of this first consultation was clearly on the direct vision from the truck.



What operators have to fit today



FRONT CAMERA WITH OPTIONAL DATA RECORDER

IN CAB SCREEN



CYCLISTS WARNINGS SIDE AND REAR

CYCLIST VISION DOOR DEALER FIT

FRONT UNDERRUN PROTECTION



SPRAY SUPPRESSION LEGAL DEMAND ON N3

SIDEGUARDS



CAMERA ON FRONT LEFT & RIGHT BUMPER

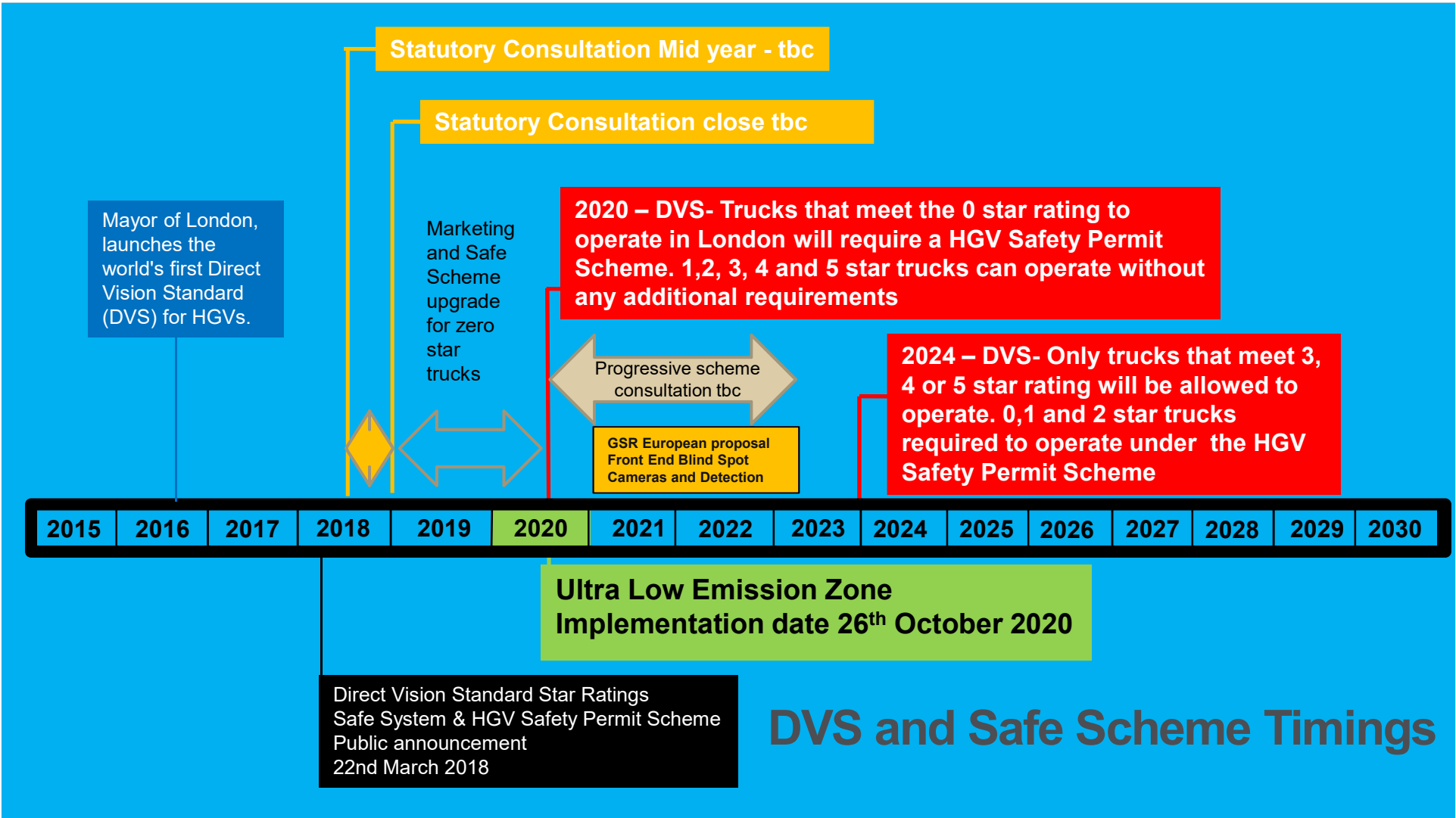


FRONT CORNER & SIDE CYCLE SENSORS WITH AUDIBLE LEFT TURN WARNING



OPTIONAL REAR UNDERRUN EXEMPTION



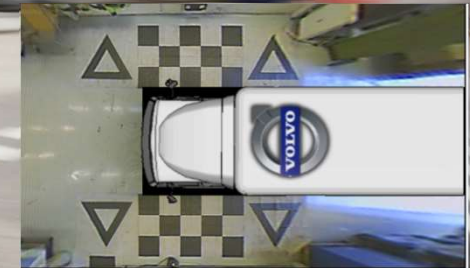


Beyond human eyes

We need a standard that not only considers direct vision
But also latest technology too



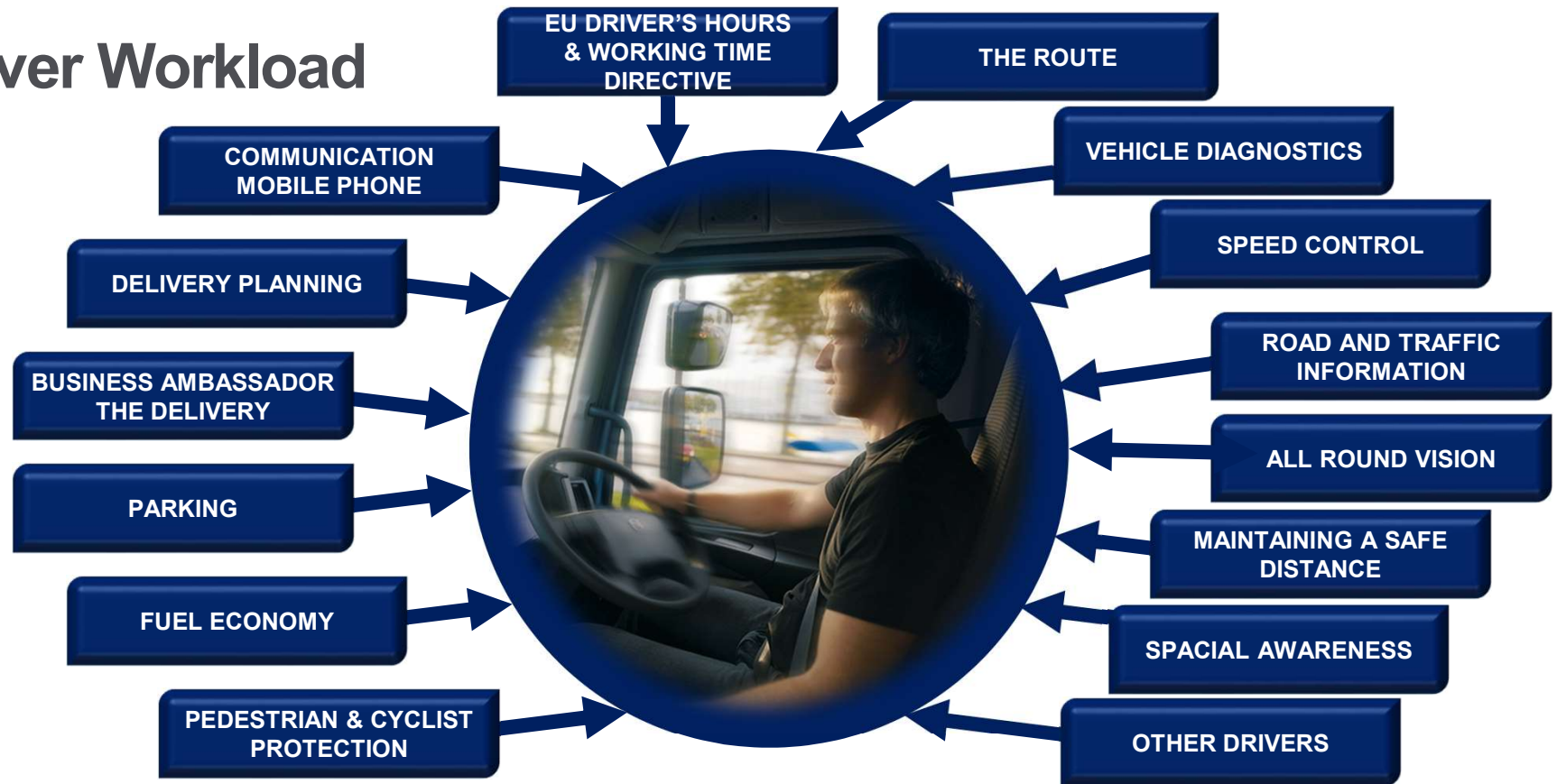
Improved Direct Vision



Camera Systems

Truck in road, cyclist on cycle path are these
two road users aware of each others presence?

Driver Workload



The Revolution

Co-operation & Working Together

- Home delivery
- Low height
- Easy entry and exit
- Low noise
- Zero emission
- Direct vision
- Sustainable returnable containers



No Lorries – No Goods



Volvo Trucks. Driving Progress

