
Half Year Results

Period ended 30 September 2011

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What has changed at Torotrak?

Strong legislative and environmental drivers – need to embrace new technologies

CO₂ reduction technology addressing OEM needs

At a fundamental level: main drive transmissions

At a lower cost of investment: ancillary drives that work alongside conventional technology

Growing endorsement from, and engagement with, industry leaders

Step up in investment by 3rd party licensees & partners

Reduction in operating costs, new delivery structure, lean PLC board

New Chairman, John Weston, ex BAE CEO

Commercial vehicles – the CO₂ position

Fuel costs and taxation burden are rising – commercial forces are driving change

Fuel accounts for over one third of whole life operating costs

Just announced in August – USA legislation for commercial vehicles CO₂ reduction

10-20% improvement starting 2017

Whole vehicle measured

Tough \$\$ penalties for non achievement

Europe remains on voluntary agreements: 20% by 2020

Commercial vehicles – what's the prize?

Enables engine to run at optimum conditions

Clean burn = cleaner emissions

Easy to drive and cost comparative to automatics

Delivers > 10% better fuel economy over current automatics

Progress:

Fuel economy benefits confirmed



Allison proceeds to next stage with production representative hardware

ETBM continuing extensive testing programme

Commercial vehicles- mechanical flywheel hybrids



Flybus consortium to show capability in a city bus

Evaluate benefits in heavy duty, high stop start conditions



Objective is a route to deliver c. 20% fuel economy improvement

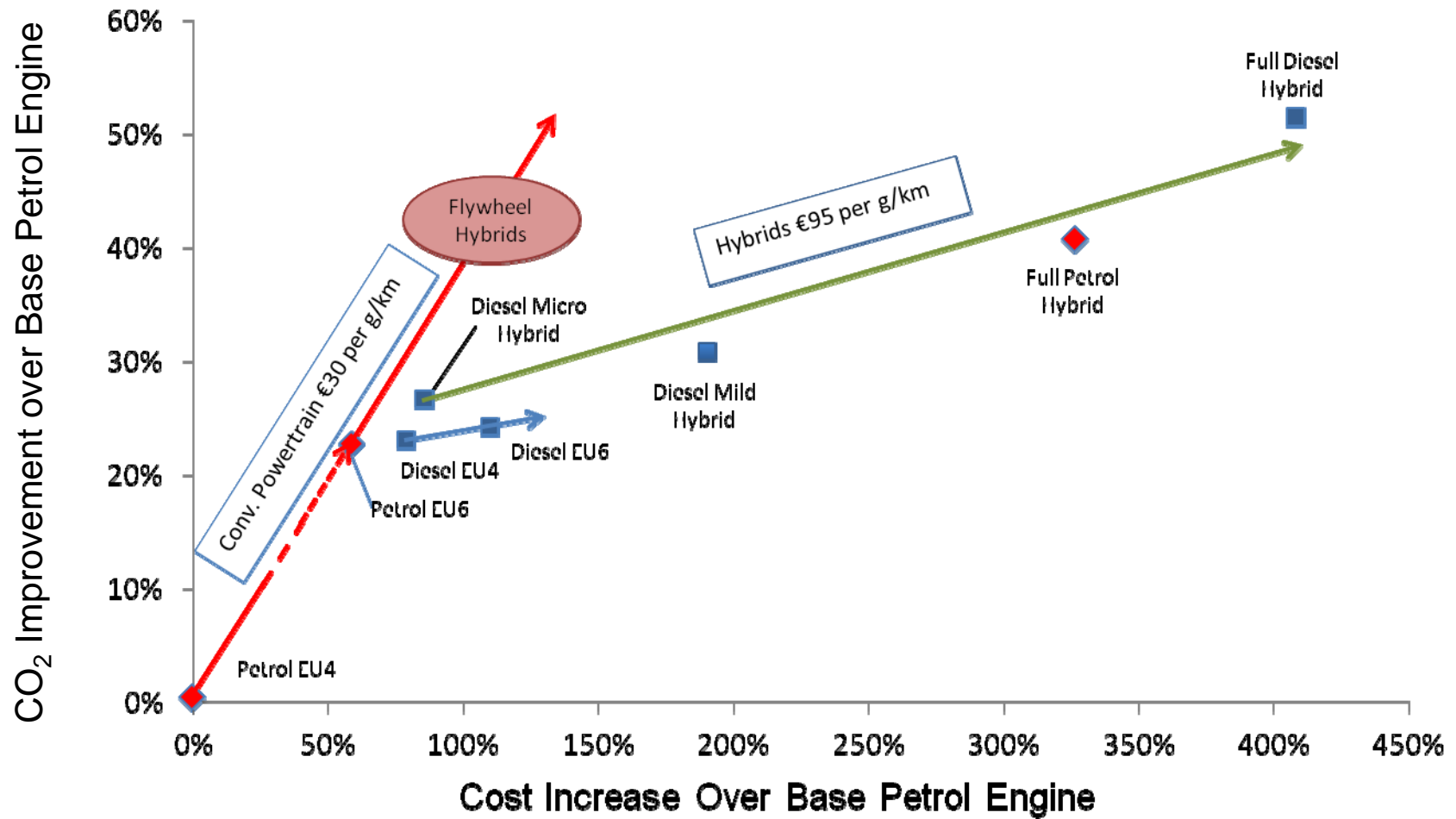


In commercial vehicles, electrical hybrids are very expensive

Works with Green Bus funding...but not on stand alone economics



Automotive CO₂ Trends



Automotive - mechanical flywheel hybrids



JLR project has shown Torotrak capability linked to stop/start

22.4% fuel economy improvement in real world cycles

To boost performance of smaller engines in cars

Aggressive cost target <50% cost of electrical systems



Volvo Car Corporation have confirmed that their new platform will feature Torotrak enabled flywheel hybrid technology

800,000 unit per annum target for platform

High percent fit of flywheel hybrid to hit CO₂ and compensate for smaller engines

Torotrak and Flybrid Systems LLP are technology providers

SKF involved in developing supply routes for traction drive

Major Tier 1 to be announced to manage industrialisation

Volvo Powertrain also involved



Automotive - supercharging

Rotrak variable supercharger

Addresses the low speed performance problem
At a cost lower than current technology solutions

Rapid “time to torque”

Complete variable control of boost pressure

Progress:

Prototype installed in Torotrak vehicle
and now on test

Further prototype now installed in a Tier 1 component
manufacturer vehicle being prepared for demonstration to
OEMs under a Collaboration Agreement with Rotrak



Variable superchargers- market opportunity

**26m engines pa forecast to be pressure charged by 2016
driven by:**

Push to downsize engines and deliver CO₂ legislation

Emergence of pressure charged petrol engines as a “clean and affordable” match for diesel fuel economy

Rotrak approach is an independent development

High volume route with automotive tier 1

Business case under development, OEMs already targeted

Low volume independent approach to seed market

Our strategy

License our technology only to manufacturers and suppliers committed to industrialisation

A variety of solutions with different costs of investment

Income secured from combination of licence and engineering fees

Achieve funding self-sufficiency in the development period

Prioritise commercial vehicle markets for initial commercialisation of main drive technology

Focus development of new technology on lower cost, fuel saving devices

Resilience

Financial

Maintain strong cash reserves - £8.8m at period end

Manage business so as to achieve broad cash neutrality up to recurring earnings/ debt capacity – positive operating cash flow in 1H

Routes to market

Maintain alternatives to achieve commercialisation objectives

Non reliance on one single partner

Work in conjunction with alternative technology providers

Engineering development resource

Leverage partner development capability - operating costs reduced by £0.8 million as result of leaner operating structure

Develop alternative engineering support capability outside Torotrak

Summary - milestone progress against objectives

Commercial vehicle transmissions

Allison Transmission Inc: achieved gateway to production representative prototype programme; confirmed commitment to increasing licensing scope

ETBM: continued extensive testing and evaluation

Variable drive mechanical flywheels

Volvo committed to development programme using Torotrak/Flybrid system

Prodrive test proves 22.4% increase in fuel efficiency fitted into a Jaguar

Optare bus has Torotrak/Ricardo system successfully integrated

Variable drive supercharging

“**Rotrak**” unit now undergoing in-vehicle testing; installed in an automotive Tier 1 manufacturer’s vehicle for demonstrations to target OEMs

Industrialisation of key components

Multiple manufacturers engaged in development of supply routes for discs, rollers and fluids

Financial Performance

	2011	Restated 2010
	£m	£m
Revenue	0.8	2.0
Loss after taxation	(2.0)	(1.8)
Operating cash inflow/(outflow)	0.7	(2.5)
Period end net cash	8.8	10.0

Income statement

Period ended 30 September 2011	Engineering services £000	Income from Licence agreements £000	Total £000
Revenue (by market)			
Commercial vehicles	768	-	768
Off-highway	-	-	-
Automotive	22	-	22
Other	17	-	17
	807	-	807
 Period ended 30 September 2010			
Revenue (by market)			
Commercial vehicles	1,157	743	1,900
Off-highway	-	-	-
Automotive	102	-	102
	1,259	743	2,003

Outlook

Torotrak is well-funded and has multiple pathways to successful commercialisation

Programmes have advanced well in the First Half, generating increased confidence of success

Expect to report increased revenues in the Second Half

Good prospects for further licensing and development agreements

Appendix

What is Torotrak Technology?

“Gearless” traction drive

As a transmission, manages the engine at its sweet spot

As a variable drive:

- Allows energy to be recovered & transferred efficiently – mechanical hybrids
- Enables a supercharger to boost an engine efficiently at any speed

Resulting in:

- Improved fuel economy, especially on stop/start and integrated cycles
- Reduction in emissions
- Greater refinement & controllability
- Ability for manufacturers to add value enhancing features
- Cost competitiveness

[Animations available]

Newsflow last 6 months

March Tata Pixel concept revealed at Geneva with Torotrak zero turn transmission

April Allison Transmissions £8m further licensing commitment & move to production intent development

May Volvo Car Corporation confirms evaluation of Torotrak equipped Mechanical Flywheel energy recovery system

July Torotrak displays new variable drive supercharger installed in Renault

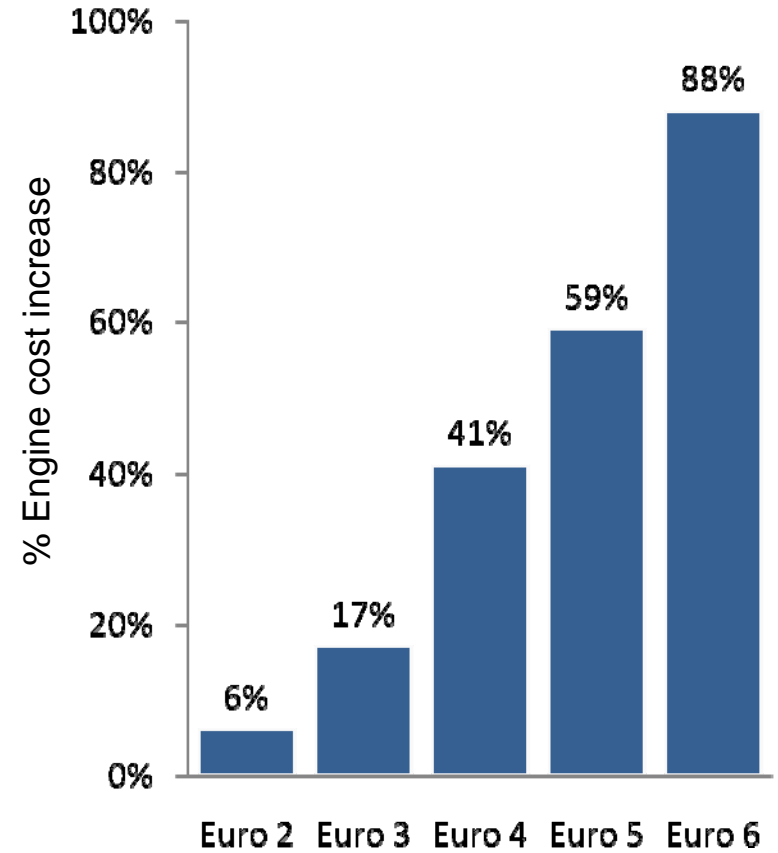
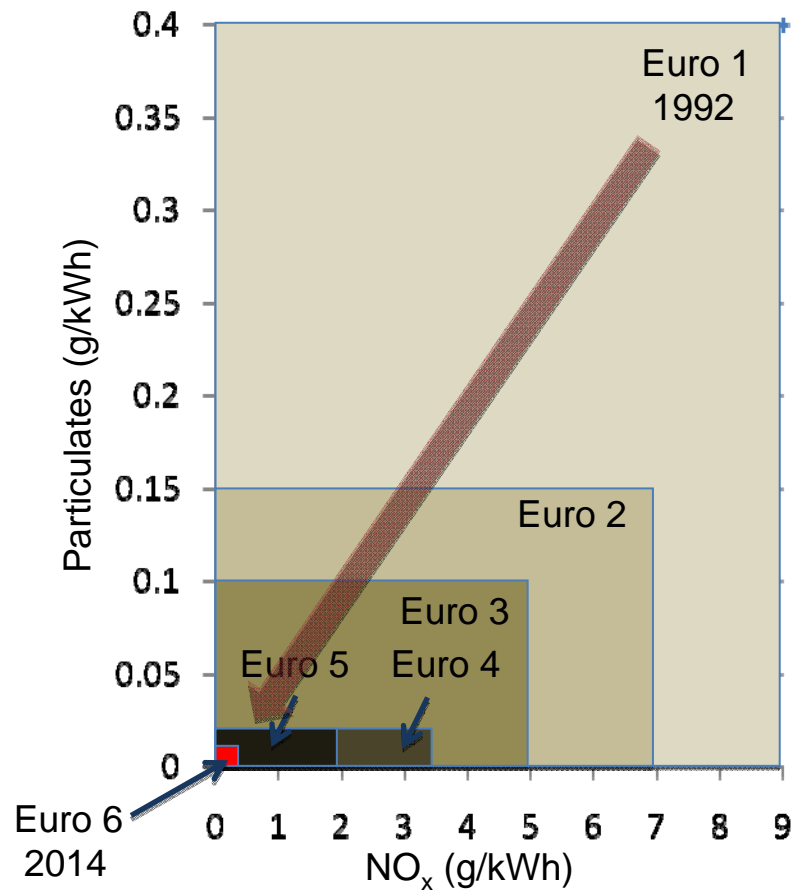
August Ricardo announces breakthrough in its 2nd generation high speed flywheel

September Volvo announces that in autumn it will be one of the first car manufacturers to test the potential of flywheel drive on the road – “The flywheel system offers the driver an additional 80hp whilst reducing fuel consumption by up to 20%”

September “Flybus” consortium led by Torotrak announces successful integration of prototype hardware into an Optare bus

September – Prodrive led “FHSPV” programme announces 22.4% fuel saving in a Jaguar from a Flybrid/Torotrak flywheel system (Artemis cycle) – less than half the cost of an electric equivalent

Commercial vehicle emissions

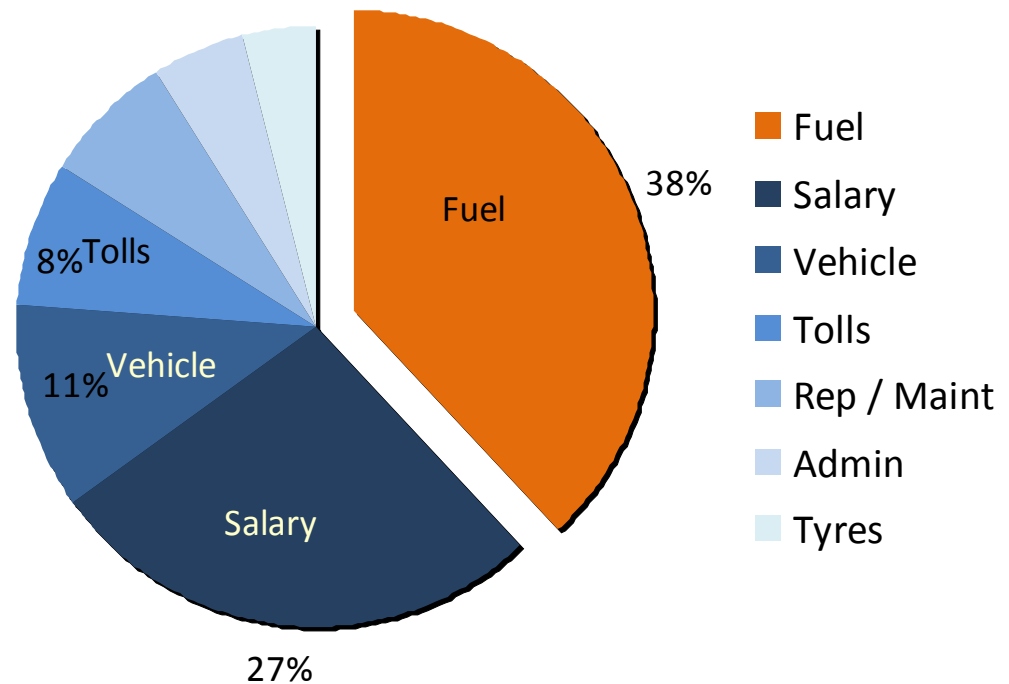


* Cost increase over Euro 1

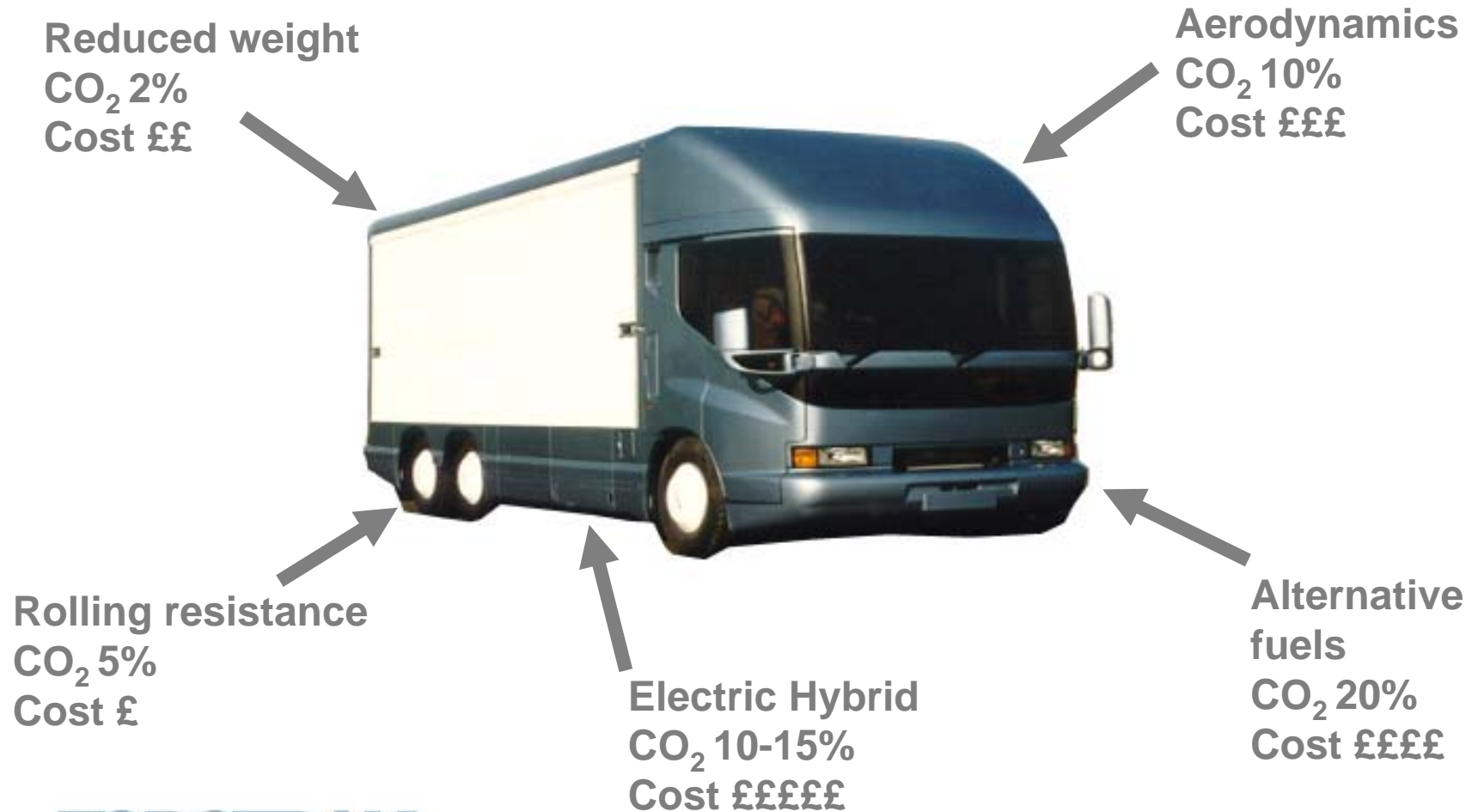
Commercial vehicles – the CO₂ position

“Achieving Euro emissions is being pursued to the detriment of improved engine efficiency” – Stobart Group

Total cost of ownership
150,000 km

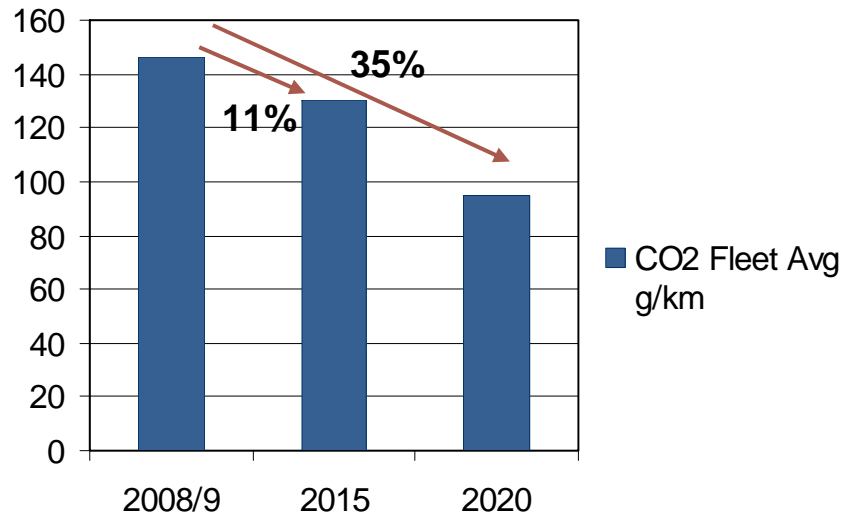


Commercial vehicles - Available CO₂ technologies

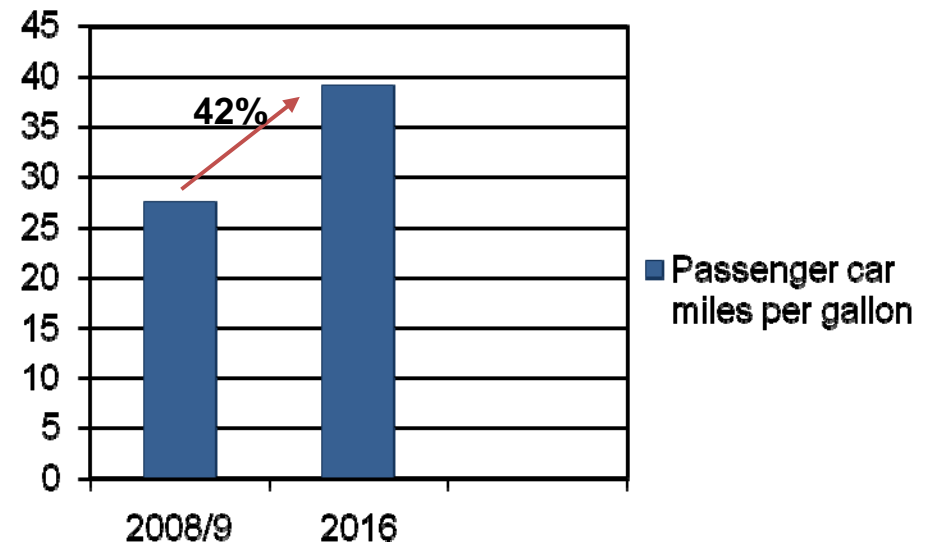


CO₂ legislation - cars

Europe



USA



Penalty based: Each car over fleet average target = punitive fine

This is driving significant uptake of new technologies to mitigate CO₂

Protect IP and maximise returns

Patents

- **Worldwide, appropriate protection**
- **Interdependencies amongst patent families**
- **New inventions**

Know How

- **Our knowledge and tools are highly valued**
- **Only transferred when accompanied with commercial agreements that define IP rights and potential earnings share**

Value added

- **Royalties or earnings share based on the entire system that Torotrak technology enhances**

...all projects start and end with Torotrak commercialisation objectives

Torotrak licensee/ partner model

Shared vision

- **Strategic interests aligned**
- **Board level personal commitment**

Defined investment in Torotrak technology

- **Visible level of financial commitment**

Returns

- **Defined royalty regime or earnings share**
- **Up front fees where warranted by Torotrak opportunity costs**
- **And/or risk capital committed by 3rd party to develop technology**

Engineering

- **Torotrak not committed beyond core technology requirement**
- **Partner capability to take technology into production**

Half Year Results - Period ended 30 September 2011
