

Low Carbon Technologies for HGVs



**Presenting the winners of
the LowCVP Technology
Challenge 2010**

LowC^{VP}
low carbon vehicle partnership



© Illustration courtesy of Adam Palethorpe

Foreword

Professor Neville Jackson,
Chairman, Low Carbon Vehicle Partnership;
Group Technology and Innovation Officer, Ricardo plc

Challenging times

The transport of goods by road is a key enabler for economic activity in most, if not all economies, providing a capability to deliver goods in bulk to dispersed locations. Commercial vehicles are therefore a major contributor to business growth and success. However, road transport of goods also creates an environmental cost. In the UK 23.5% of CO₂ is produced directly from road transport of which a third is from commercial vehicles, and HGV traffic is forecast to grow by 14% by 2025.

The challenge to reduce the contribution of road freight CO₂ emissions is far from limited to the UK and whilst there are strong economic pressures to reduce fuel consumption, some governments including Japan, USA and China believe that further improvements can be gained through regulation.

This legislative action offers an unprecedented challenge to a sector where regulation to improve air quality has driven step increases in product cost and rises in fuel costs over recent years have driven a significant escalation in operating costs.



A broad opportunity

However, these environmental pressures have given rise to a major opportunity for innovators of new technologies focused on reducing fuel use and improving operating efficiency. Competition in the goods transport sector has driven relatively low margins, increasing the sensitivity to fuel prices. Doing more with less, more effectively and more efficiently is a constant paradigm for the industry.

The winners of the LowCVP Technology Challenge are exemplars of the new innovations that can be brought to the sector. A wide variety of potential solutions has emerged, from black boxes to encourage more efficient driver behaviours, hybridisation systems for powertrains, technologies enabling more goods to be packaged into the same envelope, to the benefits available through mixed fuel use.

The developers of these technologies must be commended, but so too must the fleet operators and vehicle manufacturers, rising to the challenge of climate change impact and recognising the opportunity to source outside solutions to spur their own growth and, in both real economic as well as environmental terms, their sustainability.

A handwritten signature in black ink, appearing to read 'N Jackson'.

The Low Carbon Vehicle Partnership (LowCVP)

2

The LowCVP works to accelerate the shift to low carbon vehicles and fuels and create opportunities for UK business.

Stimulating markets for lower carbon technologies

New and improved vehicle and fuel technologies are radically reducing the environmental impacts of road transport. LowCVP works to tackle market barriers to the introduction and growth of lower carbon vehicles and fuels to reduce transport's carbon footprint. Since its creation in 2003 the Partnership has delivered over one million tonnes of carbon savings through its activities.

A not-for-profit multi-stakeholder partnership of approaching 200 organisations, LowCVP members collaborate to develop consensual, evidence-based solutions to increase the deployment of and market for lower carbon vehicles and fuels. LowCVP's broad membership encompasses: the automotive and energy industries, transport users and operators, environmental organisations, academics and policy makers. Together these members take practical initiatives, share knowledge and information and provide support to Government for policy development.

Funded by a Government grant complemented by member contributions, LowCVP provides an expert, independent advocate for low carbon road transport solutions and helps UK companies capitalise on the emerging business opportunities.

Cleaner and leaner trucks

Efficient road freight distribution is a foundation of successful economies with approaching three-quarters of goods moved by road in the UK. HGVs also account for around 5% of the UK's greenhouse gas emissions. Legislation, increasing fuel costs and increasing customer concerns are all driving demand for solutions which offer cost and carbon benefits for the road haulage sector that has triggered a wave of new technical innovations.

The LowCVP's Technology Challenge is designed to ease and accelerate the pathway through which UK businesses are bringing low carbon truck technologies to market. The work complements that of the UK's Automotive Council to develop a roadmap for and strengthen the UK automotive supply chain.

LowCVP's Technology Challenge helps to connect emerging technology-based companies with the established supply chain and major fleet operators - reducing the time for new technologies to reach the market, increasing returns for early adopters and delivering CO₂ savings. Early engagement provides competitive advantages for adopters of new solutions and experience helping to improve the product. This also benefits UK plc by strengthening the value of intellectual property and establishing skills and engineering excellence that can then be used to create new export markets.



“We are heartened by the strong support the initiative has received from both technology companies and major vehicle manufacturers and fleets, demonstrating their commitment to finding new solutions for reducing carbon emissions from trucks.”

Greg Archer, Managing Director, LowCVP



Can your technology reduce the carbon footprint of a Heavy Goods Vehicle?



Enter the Challenge. See over for details. **LowCVP**



LowCVP Challenge 2010

A catalyst for mutual opportunity

The Challenge first ran in 2009 seeking lower carbon innovations for passenger cars. A new, structured process was developed through which candidate innovations were reviewed by a panel of experts before the winners were provided with training and the opportunity to present to vehicle manufacturers, suppliers and major fleets providing the potential for new relationships between major organisations and suitable emerging companies to be catalysed. The LowCVP Technology Challenge therefore provides an opportunity for:

- Emergent supply chain companies and technology developers to differentiate and provide credibility to their solutions for lower carbon vehicles; and
- Vehicle and component manufacturers and fleet operators to identify the most promising technologies that reduce fuel costs and carbon.

Promoting good ideas

Entrants need to demonstrate that their technologies meet the entry criteria to: reduce CO₂ emissions from heavy goods vehicles by around 20%; to be commercially deployed in 3–5 years; be on-vehicle; and be compatible or easily integrated into the existing transport, energy and fuel infrastructures.

Launched at the LowCVP Annual Conference, July 2010, this year's Low Carbon Technologies for HGVs Challenge has proven even more successful with new entrants, vehicle manufacturers and fleet operators alike.

>>>

“We devised this competition together with our Members to benefit everyone involved and following an ‘open innovation’ format I certainly think this is being achieved. Innovative product developers are gaining a valuable platform from which to engage prospective customers. These astute individuals and potential early adopters are in turn being introduced to credible, advantageous solutions.”

Roy Williamson, LowCVP

Twenty-one diverse solutions were entered in 2010 and assessed by a panel of experts in automotive technologies, innovations and fleet operations against a range of criteria, including: potential impact of the technology for reducing vehicle CO₂ emissions; commercial viability, and; ease of integration.

The prize of the Challenge is to present winning innovative products to a select group of executives from key customers seeking cost effective solutions to lower CO₂ emissions and improve vehicle efficiency. The 2010 winners will present to senior representatives from companies including: Allison Transmissions; Cummins; DAF Trucks; Daimler; Dennis Eagle; DHL Supply Chain; GKN UK; Iveco; Isuzu; Leyland Trucks; MAN Truck and Bus; Ricardo; Royal Mail Group; Serco Solutions; Eddie Stobart Ltd; TDG; Tesco Stores Ltd; Unipart; Volvo Trucks, and; Wincanton.

This outstanding grouping of companies demonstrates the wide range of organisations in the road haulage sector interested in developing and deploying lower carbon, fuel saving technologies. This brochure presents the Winners of the LowCVP Low Carbon Technologies for HGVs Technology Challenge.



Previous winners' comments

"As a winner of the Challenge, the opportunity to present to a room packed with potential customers was pretty unique and gave a real boost to awareness of CPT's stop-start, engine-boosting and power regeneration technology; normally it would take months of effort to meet this number of decision makers."

**Guy Morris, Engineering Director & CTO,
Controlled Power Technologies**

"Winning the LowCVP Technology Challenge raised awareness of our HCCI control technology not just at a national level but internationally, with interest being received from prospective customers and co-developers around the world."

**David Tonery, Managing Director,
Oxy-Gen Combustion**

"Winning the 2009 Low CVP Technology Challenge has provided a huge boost in industry awareness of our leading edge axial flux technology and provided a valuable platform to build customer engagements."

**James Rosson, Commercial Manager,
EVO-Electric**

"The CO₂ reduction potential of Axon's light weight structural components in carbon-fibre has been given industry-wide recognition as a result of winning the Technology Challenge."

**Steve Cousins, Director, Managing Director,
Axon Automotive**

"As a direct result of the Challenge, we have been able to engage OEMs, interested in our ultra light, ultra efficient, low cost, low emission, revolutionary rotary engine; which is ideally suited for the 'electromobility' paradigm shift to hybrid and plug in hybrid electric vehicles."

Dan Aris, Managing Director, Libralato

"Winning the Technology Challenge provided market credibility for the simple air-hybrid retrofit concept developed by Brunel."

**Hua Zhao, Director, Centre for Advanced
Powertrain and Fuels, Brunel University**

Winners

LowCVP Low Carbon Challenge 2010

Low Carbon technologies for HGVs

5



flybridsystems



Flybrid Systems

6

Flybrid Systems is the leading provider of high-speed flywheel based hybrid systems for automotive application. The Flybrid system was initially developed in 2007 for Formula One application but today the majority of customers are road-car OEMs and the first cars incorporating Flybrid® technology are expected to go on sale to the public in 2013. Flybrid are now developing a heavy-duty version of the system and have their sights set firmly on expansion into commercial vehicle and off-highway markets.

How do flywheel hybrids work?

Flywheel based hybrid systems work in much the same way as the more common electric battery based systems, storing energy when the vehicle slows down instead of wasting it as heat in the brakes and then recovering that energy to drive the vehicle back up to speed. Flywheel hybrids store this regenerated energy as kinetic energy in a rotating flywheel and energy stored in this way is proportional to flywheel speed squared – so the faster the flywheel goes the smaller and lighter it can be. A typical Flybrid flywheel is around 200mm in diameter and rotates in a vacuum at up to 60,000 rpm. The flywheel is connected to the vehicle drive train by its own small transmission system and an electro-hydraulic control system adjusts the amount of energy being passed to and from the flywheel during operation. The pure mechanical connection ensures a much higher overall efficiency than is possible with batteries as energy is transferred, rather than being transformed from kinetic to electrical to chemical and back again.



Flybrid Systems offer a complete mechanical hybrid solution using a 60,000 rpm flywheel for energy storage to provide unmatched efficiency, weight and cost. 20%+ savings should give a three year break even on fuel costs alone.



flybridsystems

7



High-speed flywheel based energy storage systems using Flybrid® technology are powerful, small and light giving a better power to weight ratio than existing automotive hybrid technologies. This higher power makes it possible to store more energy during short braking periods dramatically increasing system effectiveness. The systems are also very efficient with up to 70% of braking energy being returned to the wheels to drive the vehicle back up to speed.

Key points

- **Demonstrated Technology**

Systems are testing today in development vehicles for OEM carmakers with start of production targeted for 2013.

- **Proven Safety**

Flybrid have proven flywheel safety by performing a crash test at the University of Cranfield. Deceleration peaked at 24'g' and no damage was done to flywheel or containment.

- **Vacuum Seal**

Flybrid's patented vacuum seal enables the flywheel bearings to be located outside of the vacuum chamber, where they can easily be lubricated and cooled ensuring durability for a long life application.



3

1. The steel and carbon fibre flywheel rotates at up to 60,000 rpm.
2. This complete system weighs less than 50kg.
3. The original Flybrid system was developed for Formula One.

Vehicles equipped with this type of hybrid system promise to deliver low CO₂ emissions at an attractive price and this combination of characteristics has already attracted vehicle development programmes with several major car makers.

Flybrid Systems are investing in machinery and manufacturing process development to become the supplier of the complete system in low volume production. They are building towards a UK based production facility that will be able to make 1,000 units per year by 2013.

Flybrid Systems LLP
Silverstone Technology Park
Silverstone Circuit
Towcester
Northamptonshire
NN12 8GX

Tel:
+44 (0) 1327 855190

Email:
mail@flybridsystems.com

Web:
www.flybridsystems.com

LowC^{VP}
low carbon vehicle partnership

The Flybus Consortium

8

The Flybus Consortium brings together engineering talent from lead partner and variable drive specialist Torotrak, bus maker Optare and engineering consultancy Ricardo, supported by automatic transmission supplier Allison Transmission Inc. Part-funded by the Technology Strategy Board, the collaboration is developing a cost-effective flywheel-based mechanical hybrid system for commercial vehicles, particularly suited to vehicles that are subject to extensive stop-start activity, such as buses.

The Flybus system is being installed in an Optare Solo midibus fitted with an Allison automatic transmission, Torotrak's variable drive and Ricardo's high-speed carbon composite 'Kinergy' flywheel.

Flywheel hybrids, as with all hybrid systems, recycle the kinetic energy that would otherwise be wasted as heat when the vehicle brakes. As the vehicle slows, the variable drive transfers the energy into the flywheel, spinning it up to speeds of around 60,000 rpm. Since the flywheel speed is independent of both vehicle and engine speed, to provide the correct amount of torque at all times the flywheel must connect to the driveline via a stepless transmission providing a continuously variable speed ratio.

When the vehicle pulls away from rest or starts to accelerate, the variable drive returns energy from the flywheel to the vehicle, so improving fuel economy and reducing CO₂ emissions.

Economic benefits

For only a small proportion of the cost of other systems, the Flybus flywheel hybrid is targeted at delivering around 20% savings in fuel consumption and CO₂ emissions. The flywheel's high power density produces a lightweight system that is easier to package than battery-electric hybrid systems. And, given the long service life of buses, there is a clear need for a commercially attractive, simple hybrid system that can be retrofitted cost-effectively to existing vehicles. The Flybus system design allows for this, connecting the flywheel hybrid unit to the automatic transmission, via one of its available Power Take-Off (PTO) drive shafts.

Market potential

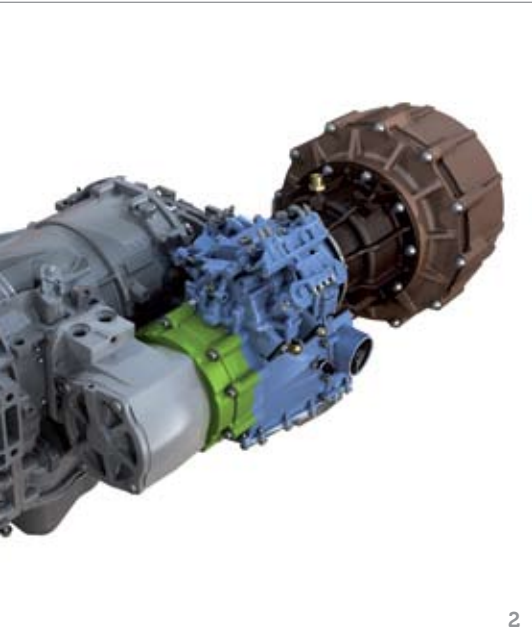
The financial pressures faced by local authorities and bus operators can make conventional hybrid technology unrealistic without substantial subsidies. Besides reducing cost, the Flybus technology offers a simple installation, and its size and compatibility with the existing driveline makes it possible to convert existing fleets without reducing passenger capacity. The system could be equally effective on other commercial vehicles, such as delivery vans and trucks operating a stop-start schedule.



With both line-side and retrofit capability, the Flybus flywheel hybrid system significantly reduces fuel consumption and CO₂ emissions in HGVs at a fraction of the cost of electric hybrid systems.



Kinetic Energy Recovery Systems for Buses



2



3



4

Torotrak plc on behalf of
The Flybus Consortium
1 Aston Way
Leyland
Lancashire
PR26 7UX

Tel:
01772 900900

Fax:
01772 900929

Web:
www.torotrak.com

Key points

- Flywheel hybrids are a cost-effective alternative to battery-electric and other hybrids. The variable drive, coupled to the high-speed flywheel, creates a power-dense and compact unit.
- Fuel savings of around 20% in city buses are expected, representing a substantial reduction in running costs for commercial vehicle operators.
- The technology is scaleable and will be effective on other commercial vehicles, such as delivery vans and trucks operating a stop-start schedule.
- The Flybus system can be developed for retro-fitting to existing vehicles. The unit's high power-density makes it easy to package. Connecting via the power take-off drive shaft makes installation into the existing vehicle driveline straightforward.

1. The Flybus flywheel hybrid prototype demonstrates a cost-effective alternative to electric hybrids for commercial vehicles.
2. The flywheel hybrid bolts onto the automatic transmission via the power take-off drive shaft, recycling the kinetic energy that would otherwise be wasted when the vehicle brakes.
3. The Ricardo 'Kinergy' high-speed, hermetically-sealed flywheel energy storage system incorporates an innovative and patented magnetic coupling mechanism.
4. Torotrak's variable drive is the interface between the flywheel and the main drive transmission, managing the flow and quantity of energy in and out of the hybrid system.

Hardstaff Group

10

The Hardstaff Group, pioneers in the development and use of dual fuel in heavy haulage vehicles, first demonstrated around ten years ago that this technology could significantly reduce CO₂ and other harmful diesel tailpipe emissions. More recently the Company has proved, through daily dual fuel operation of 60 of its own vehicles, that substitution of up to 70% of diesel fuel by natural gas is practicable, reducing CO₂ emissions by up to around 18%.

Background

It is only in the last decade that natural gas as a vehicle fuel has been promoted both on the basis of lower operational cost and reduced emissions. Gas combustion is cleaner than both diesel and petrol but its high auto-ignition temperature previously restricted its use to engines with spark ignition.

Diesel engines have many advantages over other internal combustion power units, and have been specified more widely over recent years in the vehicle manufacturing sector. Diesels are more efficient, reliable and generally last twice as long as petrol engines; they also produce greater lower speed torque, making vehicles more 'driveable'.

It is estimated there are 350,000 diesel goods vehicles in the UK, using 2.7 billion gallons of fuel and emitting around 32 million tonnes of CO₂, annually. It is considered unlikely that electric or hybrid power will be able to reduce this burden in the short term.

Technology

Hardstaff's patented OIGI® (Oil-Ignition-Gas-Injection) technology is an electronic system that reduces the diesel injected into the engine, equally replacing it with natural gas. With typical substitution rates of around 60–70%, CO₂ emissions (on fossil methane) are reduced by up to 18%, CO by 98%, with at least 30% reductions in NO_x, smoke and particulate emissions.

The technology works equally well on sustainably produced biomethane, which is generally reckoned to at least double CO₂ savings. Such green credentials, however, do not carry performance or cost penalties; experience shows no loss of driveability and fuel cost savings are significant, giving short payback periods on adaptation costs, relative to HGV service life.



Dual fuel technology applied to heavy diesel vehicles reduces operator fuel costs and significantly lowers CO₂ and other tailpipe emissions harmful to health. Best of all, it is available now for OEM and existing vehicle adaptation.



While it incorporates an additional electrical control unit, manifold gas injection, extra exhaust catalysts and on-vehicle gas storage, OIGI® uniquely does not require access to the OEM's ECU in order to control diesel reduction and injection timing. Thus the integrity of the intelligent vehicle systems, including safety and braking control, are not compromised, obviating many of the warranty concerns which have hitherto been a barrier to entry.



Key advantages of Hardstaff dual fuel

- Reduction in use of oil based fuel by around 60% – 70% per vehicle.
- Realistic savings in CO₂ emissions of around 15% – 18% per vehicle, potential 5.5m tonnes for UK.
- Significant reductions in tailpipe pollutants, known to cause asthma and other health issues.
- Fuel cost savings of around 28% at current prices.
- Powerful economic argument for adaption of new/existing vehicles.
- Diesel driving and operating characteristics unaltered.
- Able to operate on sustainable biomethane.
- Non intrusive electronics winning manufacturer approval.

T Baden Hardstaff Ltd
Hillside
Gotham Road
Kingstin-on-Soar
Nottingham
NG11 0DF

Tel:
0115 983 0083

Fax:
0115 983 1075

E-mail
enquiries@hardstaffgroup.co.uk

Web:
www.hardstaffgroup.co.uk



1. Dual fuel engine.
2. Gas Station.
3. Customer vehicle adapted to dual fuel operation.
4. Hardstaff dual fuel demonstrator.

MIRA Ltd

12

MIRA Ltd. is a global engineering consultancy and test services provider with a long history of optimising aerodynamics in the haulage industry. MIRA was responsible for the Truck Aerodynamic Styling Good Practice Guide, as well as numerous commercial projects around the world with both truck and trailer OEMs.

Following an extremely successful project with Lawrence David Limited in which drag reductions of 17% were achieved, MIRA took a decision to enter the LowCVP HGV Technology Challenge to further highlight the importance of aerodynamics in reducing CO₂ and fuel bills. MIRA focussed on improving the performance of a standard 4.5m box trailer with results that are extraordinary. Drag was reduced by nearly 30%, potentially resulting in fuel, and hence CO₂, savings of between 15% and 20%.

Advanced aerodynamics

MIRA used its cutting edge 'open source' CFD simulation techniques to optimise the design of a box trailer that already had aerodynamic devices in the form of side skirts and a cab spoiler. 'Morphing' techniques that change the shape of existing CAD geometry were used to modify the design to incorporate a more aerodynamic shape. In addition underbody panels were produced for both the cab and trailer in order to maximise the potential drag reduction.

Both operational and maintenance considerations were taken into account. For example the rear door aperture has been kept at the same height as a standard 4m trailer to ease loading. Design ideas have been considered to allow fleet operators easy access through the underfloor panelling for routine maintenance on brakes and axles. Apertures have also been left in the side skirts to allow for checking of the wheel nuts.

MIRA also kept in mind other important performance indicators throughout the design process, for example simulations were conducted at yaw to establish the crosswind behaviour of the revised trailer. Results from these runs confirmed that both lift and sideforce had been reduced and hence crosswind stability improved.

In addition to crosswind behaviour, the fact that the wake sizes at both straight ahead and yaw conditions have been significantly reduced should have a positive effect on the amount of spray generated by the design on wet roads.

Business case

Capital cost is often used as a justification for not incorporating more aerodynamic devices in the haulage industry but having had discussions with a number of trailer manufacturers MIRA feels that payback could reasonably be expected in less than a year, with significant savings achieved over a typical lifetime of 5 to 7 years.



2

A new 4.5m MIRA trailer design that has 30% less drag than conventional box trailers could result in on-road savings of between 15% and 20% on fuel, and hence CO₂.



Key Points

- Drag reduction of nearly 30% achieved for a minimal reduction in load volume
- Fuel and CO₂ savings of 15% to 20% estimated for typical long haul routes
- Low capital cost, payback is estimated to be less than a year

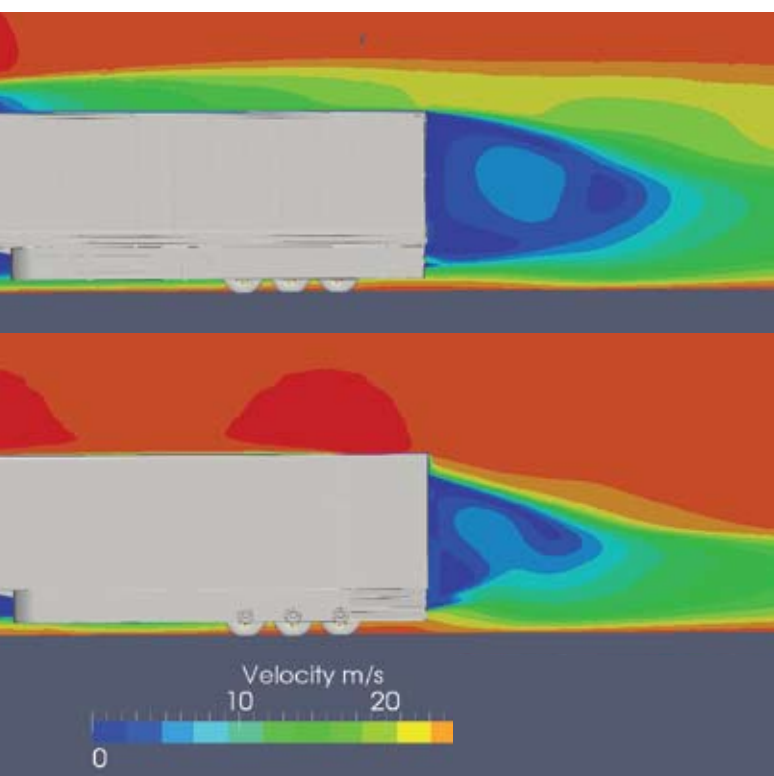
MIRA Ltd
 Watling Street
 Nuneaton
 Warwickshire
 CV10 0TU
 United Kingdom

Telephone
+44 (0)24 7635 5000

Fax
+44 (0)24 7635 5355

Email
enquiries@mira.co.uk

For more information visit
www.mira.co.uk



1. Comparison of pressure coefficient in the x-direction (drag) for the baseline and MIRA trailers, showing the effect of the improvements of drag (smaller orange area).
2. Comparison of flow velocity showing the improved condition at the leading edge of the roof, as well as the reduced wake size (smaller blue area) for the MIRA trailer.

RDS Europe Ltd

14

Regenerative Drive System

RDS offers a highly effective and exciting prospect for delivery and utility commercial vehicle operators seeking outstanding fuel economy and low emissions for their fleet. RDS is a hydraulically actuated parallel hybrid technology, specifically tailored for the needs of the +5 Tonne GVW segment. Tests have demonstrated up to 25% fuel savings for stop/start urban duty cycles. Exhaust emissions such as CO₂, NO_x and particulates are similarly reduced.

Simple design, clever controls

RDS is a simple concept based on established engineering principles. It is easily installed as a dealer-fit option on new vehicles, or retro-fitted to vehicles already in service with minimum modification. The proprietary pump/motor design allows RDS to be fitted to vehicles with either manual or automatic transmissions.

The key to its outstanding performance lies in sophisticated software controls that interpret the driver's throttle pedal movements. These are detected via a pedal intercept device allowing both energy recovery and propulsive torque delivery to be effectively managed. This results in a system providing exceptional drivability, reliability and safety.

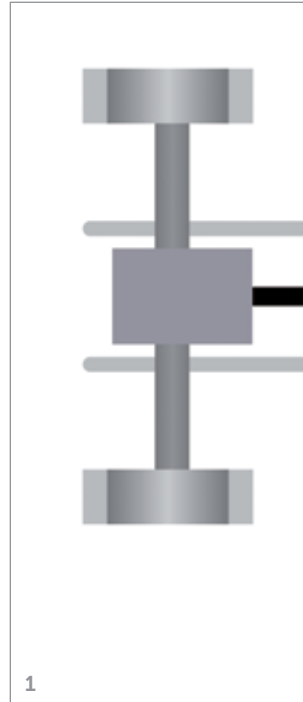
Cost savings beyond fuel alone

Depending on mileage, current UK prices mean RDS could pay for itself in circa 2 years, based on the fuel saving alone. With fuel duty set to increase, the economic case for RDS only gets stronger. Other cost savings may also be considered.

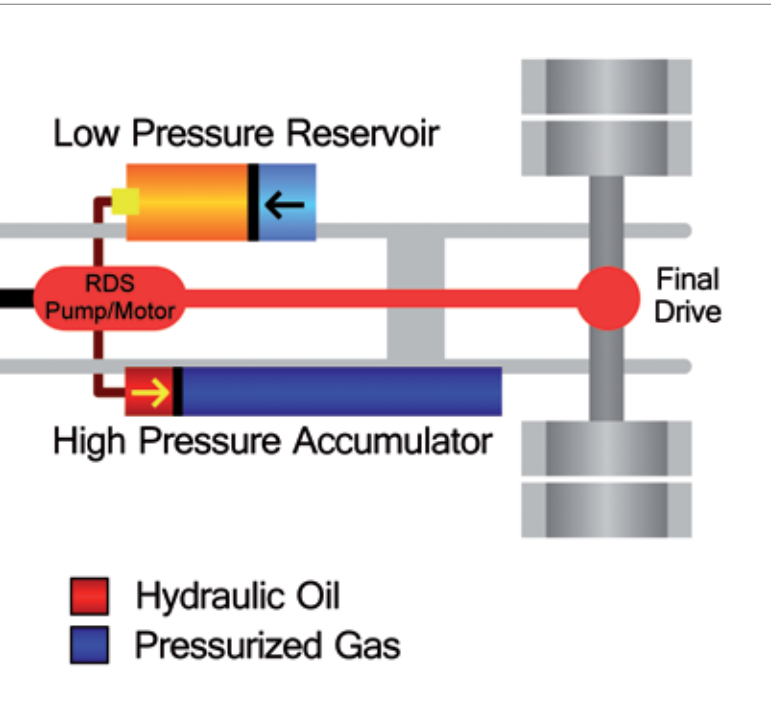
RDS provides a supplementary braking force, analogous to an engine or Jake brake system. This can increase the service intervals of the conventional brake system by up to 100%. Additionally, vehicle service intervals are often dictated by the severity of the duty cycle. RDS dramatically reduced the load stress on the drivetrain, facilitating longer service intervals (subject to OEM approval) and reduced fleet downtime. For some applications, RDS may enable the operator to downsize the engine when ordering a new fleet, leading to a cheaper vehicle configurations and further fuel savings.

And about those emissions...

Because RDS contributes to reduced exhaust emissions, it could be used as part of a fleet retro-fit strategy for Low Emission Zone (LEZ) compliance (subject to appropriate certification).



Regenerative Drive System (RDS) retro-fit hybrid solution for urban delivery and utility truck applications. Saves on fuel and maintenance costs, reduces vehicle downtime and emissions. Combines safety, reliability and driveability.



Key Points

- Hydraulic parallel hybrid system – tailored for retro-fit to commercial vehicles 5 MT and over
- Improved fuel economy – 25% reduction in fuel consumption leading to circa 2 year payback
- Reduced Emissions – 25% lower CO₂, with commensurate reduction in other exhaust emissions.
- Lower maintenance costs – Increased brake life and service intervals leading to lower maintenance costs and vehicle downtime
- Drivability – better acceleration and driving experience, easy to operate and liked by drivers
- Safety – better braking efficiency without exposure to high voltage hazards of electric hybrids during servicing or breakdown/emergency recovery.



RDS Europe Ltd
 Communications House
 26 York Street
 London
 W1U 6PZ
 United Kingdom

Telephone
Tel: +44 (0) 207 206 7292

For more information visit
www.rdseurope.co

1. RDS hydraulic hybrid schematic.
2. Typical urban delivery truck, suitable for RDS fitment.

SOMI Trailers Ltd

16

The idea is simple, the realisation was challenging

Seven years work has resulted in a mechanism that lifts and levels eight tonnes, using air bags at only 2 psi. The chassis and bodywork follow the Formula One car monocoque principle where stress is measured and transferred to strong areas eliminating unnecessary bodyweight.

How it works

Load the trailer up to the rear doors, pushing the button triggers the onboard PLC which controls the whole operation. The two rear nested decks rise, the uppermost deck engages in the rolling wall. The middle 'well' deck is slightly raised clearing the locks. Its air bag is emptied under control, lowering this deck to the floor. Next the uppermost deck automatically travels forward, slowing and stopping at the correct position. Lastly, the rear lower lifting deck relocates at loading height.

About SOMI Trailers Ltd

Established in 2003 as a 'special vehicle' to develop this trailer, SOMI won R&D grants of £270,000. The business plan is to sell kits of the mechanism enabling rapid uptake. SOMI Trailers have huge export potential as Europe has 1.5 million trailers, the USA 3.6 million trailers – all 4 metre high markets.

SOMI's 17 patents (so far) include the up and over deck concept, unique air bags, levelling system and rolling walls. Additionally, re-engineering the structure of the trailer and decks by the SOMI's team at Scunthorpe was essential along with writing software. SOMI's onboard control system has an external



Replace four truck journeys with three and carry the same amount. The cost of running a truck and trailer for 10 years is 4,000 tonnes of CO₂ and circa €1.5m. SOMI's carry 31% extra by utilising space under the trailer.



SOMI Trailers Ltd
 Normanby Rd
 Scunthorpe,
 N. Lincolnshire
 DN15 9YJ

Telephone
+44 (0)1724 855191

Fax
+44 (0)1724 848440

For more information visit
www.somitrailers.com

Contact:
paulinedawes@somitrailers.com

screen showing real-time animation and any faults. The modem enables remote control and downloading of data such as doors open, motor running temperatures etc.

Environmental gains

Environmental gains are clear when three journeys replace four. First the CO₂ count is reduced by circa 133 tonnes per SOMI used per year. The retirement of older trailers and trucks has an immediate effect and using SOMIs impacts long term on truck numbers.

With fewer trucks on the roads less road traffic and infrastructure costs are expected. If half the UK HGV fleet used SOMIs, a line of trucks 120 miles long would be removed, which is over a full circuit of the M25!

Savings made on infrastructure e.g. warehouses and road repairs releases money for other projects.

As SOMIs are mainly steel and recyclable they are sustainable long term.

Logistic firms gain as their costs are reduced in many ways but carry a similar amount. These include fewer vehicles, fewer loading crews, docks and paperwork. The increased capacity is important to remove goods rapidly from producers, especially time sensitive and seasonal manufacturing.

As SOMIs use conventional loading docks and trucks, they are readily accommodated.

Key points

- SOMI trailers new technology saves CO₂, costs and infrastructure and creates wealth by replacing four truck journeys with three.
- Rapid mainstream adoption achievable by supplying mechanism kits to trailer builders.
- 17 patents granted.

HOW IT WORKS (see schematics opposite)

1. Load the trailer up to the rear doors, pushing the button triggers the onboard unit which controls the whole operation. The two rear nested decks rise, the uppermost deck engages in the rolling wall.
2. The middle 'well' deck is slightly raised clearing the locks. Its air bag is emptied under control, lowering this deck to the floor. (Inset: the external screen showing real-time action inside the trailer.)
3. Next the uppermost deck automatically travels forward, slowing and stopping at the correct position. Lastly, the rear lower lifting deck relocates at loading height.
4. SOMI truck leaving the factory at Scunthorpe.

Zeta Automotive

18

Until now, influencing the way drivers behave behind the wheel has often been based on information gleaned from telematics or as a result of driver training, and while these two very different systems have achieved their successes, they are still only passive means of control.

Powerful engines don't have to mean higher fuel bills

Today's vans and trucks often have very powerful engines designed to work efficiently when hauling their maximum payloads, and this power is available all the time, whether it's needed or not. Commercial vehicles are frequently driven with only part loads or even completely empty, and in those situations, it's very tempting for a driver to make use of that power to accelerate much more quickly than necessary – which, of course, has an adverse effect on a vehicle's fuel consumption.

Consequently after meeting with senior managers at Mercedes-Benz UK's Milton Keynes headquarters, Zeta Automotive developed and patented EconoSpeed, a dynamic throttle control system that works by simply limiting the performance of unladen vehicles.

Dynamic throttle control explained

Initially created for use with light vans, and now developed for heavy trucks, EconoSpeed can be fitted to any vehicle with an electronic throttle, and sits between the accelerator pedal and the engine's ECU computer. Zeta Automotive's Head of Business, Gordon Anderson explains;

"By electronically limiting a vehicle's maximum rate of acceleration to simulate that of a fully or partially laden vehicle, and forcing earlier gear changes by limiting the RPM, together with limiting the top speed to suit the typical routes that the vehicle follows, we can mimic the behaviour of a careful, economical driver. With installation taking less than an hour, it's a 'fit and forget' system, with no training or management required. It simply means drivers will no longer be able to over-rev their engines but when they need it, for example on a steep hill or with a heavy load, full power will still be available."

Proven fuel savings

Launched in October this year, the system has already produced some striking results. Mercedes-Benz Sprinters equipped with EconoSpeed have covered more than 40,000 miles working for Ginsters, Ocado, Parcelforce Worldwide, Sainsbury's and Waitrose – and have produced average reductions in fuel use ranging from 4.1 to 15.8 per cent. Mercedes-Benz UK have now fitted the device into their long-term Atego and low-floor Econic demonstration vehicles.

Excellent return on investment

Offering an excellent return on investment, EconoSpeed is also available on a lease purchase basis, allowing savings from month one, and with less wear and tear on the engine and drive-train, the long-term benefits will be highly beneficial to the cost-conscious operator.



EconoSpeed's unique, patented dynamic throttle control system is proven to reduce fuel consumption by up to 15% without costing the earth...



Key features

- Proven fuel savings of up to 15%
- Limits the rate of acceleration to that of a fully or partially laden vehicle
- Doesn't 're-write' the ECU
- Easily fitted in under an hour
- Removes the ability to over-rev the engine
- Fits Trucks, Buses, Vans and Cars
- Does not affect engine torque in any way
- Cost effective
- Works with any vehicle that has an electronic throttle pedal
- Can be used on Petrol, Diesel, LPG, NGT or Hybrid powered vehicles
- Optional timed engine idle cut-out available – saves even more fuel
- Dual speed version available for when towing etc.
- Optional system over-ride for 'Blue Light' operations
- Improved passenger comfort
- Easily removed when vehicle is sold

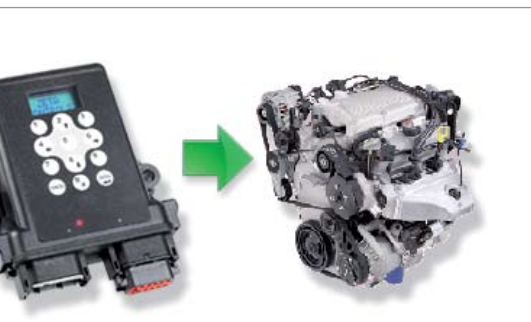
Zeta Automotive
Cappis House
Telford Road
Bicester
Oxfordshire
OX26 4LB

Tel:
01869 322500

Fax:
01869 322614

E-mail:
sales@thezetagroup.com

Website:
www.zetaautomotive.com



1. The EconoSpeed ECU is EU Type Approved.
2. Econospeed sits between the throttle pedal and the main engine ECU.

Low carbon technologies for HGVs



WINNERS
THE LOWCVP TECHNOLOGY
CHALLENGE 2010

LowC^{VP}
low carbon vehicle partnership



flybridsystems



Kinetic Energy Recovery Systems for Buses



Find out more about our current initiatives,
benefits of LowCVP membership, and future
Technology Challenges at our website:

www.lowcvp.org.uk

Presenting the winners of the LowCVP Technology Challenge 2010



Low Carbon Vehicle Partnership
83 Victoria Street
London
SW1H 0HW

Tel: +44 (0)20 3178 7859
Fax: +44 (0)20 3008 6180

Email: secretariat@lowcvp.org.uk
Web: www.lowcvp.org.uk

LowC^{VP}
low carbon vehicle partnership