



News Release

Low-cost hybrid system wins award for heavy goods vehicle CO₂ reduction technology

***Original- and retro-fit capability means potential for widespread application
including some existing vehicle fleets***

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16 November 2010 The Flybus consortium led by traction drive specialist Torotrak plc (FTSE: TRK.L) has been announced as a winner of this year's Low Carbon Vehicle Partnership Technology Challenge. The Challenge this year identified technologies that can reduce the carbon footprint of heavy goods vehicles such as trucks and buses. The consortium is developing a low-cost, easily installed, flywheel hybrid system that reduces CO₂ emission by around 20 percent during urban stop-start operation.

Torotrak's partners in the consortium include bus maker Optare, providing a Solo bus for conversion, and engineering consultancy Ricardo, providing its high-tech Kinergy flywheel technology. Allison Transmission Inc, supplier of the Solo's automatic transmission, is also supporting the project.

"The judges were particularly impressed with the system's potential to be retro-fitted to existing buses and trucks. The technology is a smart combination which allows a clever CO₂-reducing solution to many vehicles and fleets," explains Low Carbon Vehicle Partnership programme manager Roy Williamson.

Torotrak's chief executive, Dick Elsy, says: "Torotrak's traction drive has become the technology of choice in flywheel hybrids and we are proud to be working with some of the best companies in the industry. The Low Carbon Vehicle Partnership's Technology Challenge plays an important role in recognising the successes of innovative UK

companies in their efforts to deliver real-world improvements to the fuel economy and CO₂ emissions of trucks and buses.”

In addition to leading the programme, Torotrak provides the continuously variable drive technology that makes the essential link between the flywheel and the vehicle transmission. As the bus slows, instead of allowing its kinetic energy to be converted into heat in the brakes, the Torotrak variable drive transfers the energy to the flywheel, spinning it up to speeds of around 60,000rpm.

A unique feature of the Ricardo Kinergy technology is that it incorporates a patented magnetic gearing and coupling mechanism that dramatically reduces external input and output speeds for more manageable handling by the Torotrak CVT. Moreover this coupling avoids the need for a mechanical linkage to the high speed flywheel and allows the unit to be hermetically sealed, thus increasing vacuum integrity while reducing system complexity.

As the vehicle pulls away from rest, the variable drive returns energy from the flywheel to the bus, meaning there is less work for the engine to do and reducing fuel consumption. In the process, the flywheel gives up energy and slows down until re-energised during the next vehicle deceleration. The exchange of energy in both directions between systems running at widely varying speeds places exceptional demands on the flywheel drive, making a continuously variable system essential.

“Commercial vehicles operating in urban conditions would enjoy similar benefits to buses, where deliveries are closely spaced or congestion leads to a stop-start driving style,” says Elsy. “The Flybus system installation is straightforward because it connects to the main transmission PTO (Power Take-Off) which is unused on most trucks and buses. On UK roads alone, there are estimated to be over 100,000 buses and coaches and over 600,000 medium and heavy commercial vehicles. A high proportion of those have the potential to be converted, making a significant contribution to CO₂ reduction.”

ABOUT TOROTRAK

Torotrak is the world's foremost developer of full-toroidal traction drive technology. The company designs and develops Continuously Variable (CVT) and Infinitely Variable (IVT) transmissions which deliver outstanding levels of performance, functionality and refinement along with improved fuel economy and reduced emissions. Torotrak develops main drive transmissions as well as variable ratio transmissions for application in flywheel-based mechanical hybrid systems and for use as auxiliary drives. Torotrak operates in the automotive, truck, bus, off-highway and agricultural markets, in motor sport and in outdoor power

equipment. Its customers are widely spread across Europe, North America, India and Japan, and include major vehicle makers and tier one transmission manufacturers. Torotrak plc is fully listed on the London Stock Exchange. www.torotrak.com

ABOUT RICARDO:

Ricardo is a leading provider of innovative engineering solutions and strategic consulting to the world's automotive, transport and energy industries, combining business, product and process strategy with fundamental technical research and the implementation of large-scale new product development programmes. With a network of technical centres in the UK, North America, Germany, China, India, Japan and the Czech Republic, Ricardo serves a wide and balanced customer base in the automotive, transport and clean energy sectors.

For more information about Ricardo, go to www.ricardo.com

ABOUT OPTARE:

Optare plc is a leader in the UK bus and coach industry. The company specialises in the design, manufacture and supply of single and double-deck buses, coaches and smaller vehicles, and also offers a comprehensive after sales service.

For more information about Optare, please contact: Martin Hayes/David Rowlands at Automotive PR – 0207 494 8050 or go to www.optare.com

ABOUT ALLISON:

Allison Transmission, Inc. (Allison) is the premier global provider of commercial duty automatic transmissions and hybrid propulsion systems. Allison products are specified by over 250 of the world's leading vehicle manufacturers and are used in many market sectors including bus, refuse, fire, construction, distribution, military and specialty applications. Founded in 1915, the Allison business is headquartered in Indianapolis, Indiana, U.S.A. and employs approximately 3,000 people. Regional headquarters with dedicated support staff are located in China, The Netherlands, Brazil, India and Japan. With a global presence in 80 countries, Allison has over 1,550 distributor and dealer locations.

More information about Allison is available at www.allisontransmission.com

ABOUT THE LOW CARBON VEHICLE PARTNERSHIP

The Low Carbon Vehicle Partnership is an action and advisory group, established in 2003 to take a lead in accelerating the shift to low carbon vehicles and fuels in the UK and to help ensure that UK business can benefit from that shift.

The LowCVP is a partnership of around 170 organisations from the automotive and fuel industries, the environmental sector, government, academia, road user groups and other organisations with a stake in the low carbon vehicles and fuels agenda. www.lowcyp.org.uk

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 <p>Low carbon technologies for HGVs</p> <p>The LowCVP Technology Challenge Winners 2010</p> <p>LowC^{VP}</p>	<p>The Flybus consortium led by traction drive specialist Torotrak has been announced as a winner of this year's Low Carbon Vehicle Partnership Technology Challenge</p>
	<p>Torotrak's chief executive, Dick Elsy, says: "Torotrak's variable drive has become the technology of choice in flywheel hybrids."</p>
	<p>The UK's Low Carbon Vehicle Partnership has been awarded a Technology Challenge prize to the Flybus consortium, led by Torotrak.</p>
	<p>Judges noted the Flybus system's potential to be retro-fitted to many existing buses and trucks.</p>

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