

# On route for success

## A unique partnership between Alexander Dennis Limited and BAE Systems is leading the way on hybrid-electric buses

As cities and nations around the world battle to reduce traffic congestion, cut carbon emissions and improve air quality, the UK has quietly stolen a march on its global competitors by introducing technology that looks set to transform bus services to a greener, cleaner generation of low-carbon vehicles.

Behind the success lies a unique partnership between two established technology pioneers, Alexander Dennis Limited (ADL) and the advanced power management and energy systems division of global corporation BAE Systems.

Together, Britain's biggest bus and coach builder, which is currently storming new export markets in the USA, Canada, Hong Kong and New Zealand, and BAE Systems have developed a range of hybrid-electric buses that are achieving 35 per cent fuel and CO<sub>2</sub> reductions.

Almost 150 are already operating in London, Reading, Thames Valley, Oxford, East Yorkshire and Manchester, so far saving almost one million litres of fuel – and reducing CO<sub>2</sub> emissions by seven tonnes daily. These figures will increase 130 per cent when a further 200 take to the streets of Newcastle, Sheffield, Glasgow and Edinburgh over the next nine months.

The ADL-BAE Systems partnership began



ADL and BAE Systems – their range of hybrid-electric buses are achieving 35 per cent fuel and CO<sub>2</sub> reductions

***“If you have the potential to reduce your fuel bill by 35 per cent, the premium for a hybrid bus takes on a new dimension”***  
– Colin Robertson, ADL

in 2007 when they agreed an exclusive deal to develop hybrid technology for low-floor, easy-access buses, the lightweight type that dominate British and European markets.

“Early on we recognised that with BAE Systems’ expertise in hybrid power management systems and our know-how in the design and packaging of buses, we had a unique opportunity to bring something radically different to market – and to tackle the green transport agenda head-on,” says Colin Robertson, CEO of ADL.

“Our partnership with BAE Systems has been a great success and we are now Europe’s leading supplier of hybrid-electric buses, leading the world not only in fuel and CO<sub>2</sub> reductions, but in terms of reliability.

“Bus operators have demanding schedules, monitored stringently by the powers that be, and the one thing they need is a reliable bus that does what it says on the tin. Our hybrids are now achieving 98 per cent reliability, which is on a par with conventional diesels and this has been a critical factor in their acceptability.”

Robertson is the first to admit that the £100,000



**Robertson: up for the challenge**

premium on a double-deck hybrid, lifting the standard price from circa £200,000 to £300,000, remains a hurdle but believes that with government support production volumes can be moved towards a level that will enable ADL and BAE Systems to close the price differential significantly.

He says: “The government introduced various green bus funds that provided gap funding and this has stimulated early hybrid purchases, reducing the risk for operators. It has helped them to see at first hand that these buses really do make a difference.

“If you are running 8,000 buses, as some of the big operators do, and the penny drops that you have the potential to reduce your fuel bill by 35 per cent, suddenly the premium takes on a new dimension. Add to this the reliability factor and it’s a different ball game.”

Robertson’s aim now is to drive the payback on a reduced premium to about seven years, which means that operators, who typically run vehicles in the UK for 12 to 15 years, will break even on their capital cost in year seven and reap the benefits for the next five to eight years.

He says: “It’s a challenge but we can do it. The issue now is that we need continued government support to stimulate purchases and increase volumes. We are in the vanguard of this technology and despite what is said about potential hydrogen power, the reality is that it is a very long way off – and at around £1m per bus isn’t anywhere near commercially viable.

“In the medium term, say over the next ten



**Lindsay: a unique opportunity**

years, hybrid is the practical solution. If we were a car company successfully introducing a vehicle 35 per cent more fuel and CO<sub>2</sub> efficient the whole world would be crowing about Britain’s success. Government would be doing everything possible to support our efforts and to promote the potential internationally.”

This is a sentiment echoed by Rob Lindsay, director of power and energy management, BAE Systems. “The government’s support for hybrid technology through the green bus funds was a fantastic launch pad for British technology and know-how, and really made a difference,” he says.

“What we have now is a unique opportunity for the government to provide some reduced level of financial assistance to help maintain that momentum, and enable the flow of these vehicles into the market to continue and therefore drive costs down and improve the economic payback.”

BAE Systems’ goals for the bus market do not stop at the existing hybrid-electric propulsion systems. Plans are already well advanced to further reduce fuel consumption and emissions through increased vehicle electrification and improved power management, leading eventually to an all-electric vehicle. Lindsay says: “The unique BAE Systems hybrid system provides a clear path for bus operators to get to where we all want to be – at zero emissions. With existing battery technology a 50 per cent reduction is readily achievable.”

With sustained intervention from the government and the on-going collaboration between these two British technology pioneers, the future of a sustainable cleaner and greener bus market is looking positive.

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[www.alexander-dennis.com](http://www.alexander-dennis.com)  
[www.hybridrive.com](http://www.hybridrive.com)

## The experts’ view

ADL and BAE Systems’ hybrid buses have been winning plaudits from the people in the know

The ADL-BAE Systems hybrid solution was trialled extensively in London during 2009, along with other systems, and quickly emerged as the front runner.

Reporting on the London trials, the authoritative Buses magazine said: “The best fuel savings so far have been chalked up by ADL buses on route 371. These are credited with 10.9 miles per gallon on average, compared to eight miles per gallon for the diesel bus benchmark... a 37 per cent improvement.”

In 2010 the highly regarded routeone magazine test drove ADL’s 18-tonne double-deck hybrid-electric in service conditions and reported: “It’s quiet, at times whisper-quiet, smooth-running and consumes significantly less fuel... better than a 55 per cent improvement. This bus was in its element in the dense London traffic.”

Influential engineering directors were also singing the praises of the revolutionary ADL products. London-based Andy Morris, of Transdev, said: “Our ADL hybrids have proved to be excellent, with reliability and availability running at around 98 per cent. That’s good by anyone’s standards. They’ve been reliable and they deliver what they promise.

“Equally important, they have slipped seamlessly into our fleet and their maintenance regime is no more demanding than that of a conventional diesel bus.”