

Engineering breakthroughs in the municipal vehicle market are promising improved levels of fuel consumption and efficiency.

Dan Gilkes rounds up some of the latest developments

Reducing fuel consumption and lowering emissions are important considerations for any transport manager. But while optimising vehicle choice to suit the specific operation is always a first step, for municipal authorities and contractors there often just isn't the possibility of choosing the right engine output and axle ratio to control consumption while at a 56mph cruise.

Yet this does matter, because, for RCVs (refuse collection vehicles) and sweepers, the fuel bill can run as high as £20,000 a vehicle per year. Improving on that is partly about rethinking the vehicle powertrains, but also partly the function of the refuse compactor or sweeper drive. Getting the best out of both the chassis and the body installation can take some work – but also drive decent dividends.

Body developers are now considering separating the two, with, for example, some sweeper manufacturers using compact secondary engines mounted on the chassis to drive the hydraulics, rather than the PTO from the vehicle's own motor.

Mercedes-Benz takes a healthy share of around 35% of the RCV market in the UK, with its Econic truck range. Amongst the engine line-up, the company offers a natural gas unit, meeting EEV (Enhanced Environmentally friendly Vehicle) status. This engine also promises noise levels that can be up to 50% lower than those of the diesel equivalent having noise encapsulation.

Though there have been some sales of its natural gas trucks – most noticeably 10 NGT Econics to Veolia for a contract in Sheffield – there are still limitations with the gas supply infrastructure. Indeed, Basil Vinnicombe, UK special products manager at



Waste

Mercedes-Benz, agrees that, although there is clearly a benefit from using natural gas, both in terms of cost and CO₂, operators may also have to take into account a substantial investment in setting up a filling station or gas installation to allow refuelling.

Hybrid hopes

As revealed last month (Transport Engineer, October 2011, page 3), Dennis Eagle is currently working with BAE Systems on a heavy-duty hybrid system for its low-entry cab refuse vehicles.

Unlike the series hybrid that BAE supplies to bus manufacturers such as Alexander Dennis, its HybriDrive hybrid – being tested with Dennis Eagle in an Olympus RCV – is a parallel system. Here, the electric motor boosts the diesel performance under load, but also acts as a generator, for battery charging during braking.

As the brakes and steering systems remain conventionally driven, the engine has to be kept running throughout. That said, when pulling away and accelerating, the electric drive contributes up to 70kW (or optionally 110kW) to reduce the demand on the conventional engine.

Paul Childs, BAE Systems' business development manager, believes parallel systems are better than series hybrids for RCVs. For example, they allow for high-speed, long distance travel, using the engine, to and from depots and landfill sites – a world apart from the constant stop/start of a city bus.





diesel drive for the hydraulics, in the event of battery problems.

Interestingly, NTM claims an 18.5 second compaction cycle, which is certainly competitive. Also, it is possible to have a collection vehicle with stop/start technology, since the engine is no longer required to run the rear-end operation, while stationary. This results in lower noise and, just as important, NTM claims that it could result in up to 20% fuel savings.

The hybrid drive loader and compactor can be installed on most makes of truck, using NTM's KG body: the 26-tonner shown at last month's RWM exhibition in Birmingham was a Volvo FES 300 6x2 chassis. Its installation adds around £45,000 to the price of the converted truck.

One point that both Dennis Eagle and NTM agree on is that there is money to be saved by adopting a more sophisticated hydraulic system on the truck. The former is currently finalising development of a

expectations

Further, at 350kg extra for the installation, the parallel hybrid is around half the size and weight of series set-ups, which means that Dennis Eagle's RCV retains its 11-tonne payload. And he suggests a diesel engine is possible, further improving efficiency. "We are confident of achieving payback within the first five years of ownership," states Childs, acknowledging the £30,000 price hike for hybrid.

Body power

While the Dennis Eagle system, and others like it, concentrates on saving fuel through the driven wheels, Finnish firm NTM (and its UK arm NTM-GB) has developed a hybrid drive to power the body, rather than the chassis. The firm, which specialises in body conversions for waste collection, is using two packs of Lithium-Ion batteries, having tried Nickel Cadmium on earlier models.

The two battery packs are mounted on each side of the body, so there is no negative impact on load space. They do, however, steal around one tonne from the available payload. But NTM has installed its hybrid system on a split body recycling vehicle that will rarely achieve full payload in both compartments.

NTM's unit is charged overnight from the mains, with a single charge providing for up to 18.5 hours of operation, enough for two shifts. The electricity is used to power all body functions, including loading, compaction and discharge, although a conventional PTO is retained, allowing the driver to switch to

fuel-saving pack on its standard RCVs, which will include a remapped engine, a dynamic throttle pedal that pushes against the driver's foot pressure and, most crucially, variable flow hydraulics.

Similarly, NTM has introduced a revised vehicle design on the KG2B-FK, which brings hydraulic and electric functions into a single control unit. "The new vehicle has what we call an intelligent hydraulic system," explains NTM-GB's managing director Paul Westley. "This reduces load on the engine, reduces wear and tear, improves fuel consumption and reduces CO₂ emissions," he claims.

Why the change? Fixed flow hydraulic systems, though less expensive to purchase, pump the same amount of oil, whatever the demand, resulting in lost energy and unnecessary fuel burn. Variable flow hydraulic systems only pump oil when and at the rate required, using less fuel and so wasting less energy.

There is a host of innovative technologies being trialled within the municipal vehicle market, many led by local authorities and councils keen to push the environmental message. While few have yet to grab anything like a large share of the market, the next few years are going to be interesting times in the RCV sector. 

