Brake in

Fiat Powertrain Technologies' latest Cursor 16 engine offers monster power and torque, but probably won't be appearing in an Iveco truck anytime soon. Brian Weatherly reports

Fiat Powertrain Technologies' recent launch of the 15.9-litre Cursor 16 shows the dilemma facing truck makers with ultra-high power, large-displacement engines. Namely, can the considerable investment in time and money to engineer them into heavy trucks be recouped by the limited number likely to be sold in a niche market?

Just how niche can be seen by the average horsepower of UK 44-tonners. That remains firmly fixed at around 450bhp, with registrations of units at more than 510bhp accounting for less than 5%. It's also worth pointing out that, aside from Volvo and Scania, no other European truck maker offers more than 650bhp in a top weight truck.

By any yardstick, Cursor 16 is a muscular motor, capable of delivering 857bhp and 3,500Nm of torque – although, for the moment, it's only available for construction, power generation and agricultural applications. Even so, the new beast has already chalked up its first 'world's most powerful' accolade – for the latest 625bhp New Holland CR10.90 combine harvester. And note: selling across multiple markets helps defray the development costs.

So when might we see Cursor 16 powering an Iveco Stralis or Trakker? The short answer from the Italian manufacturer is: "There are no plans to roll it out into production trucks." Is that the end of the story? You can seldom say 'never' in trucking and, as Cursor 16 has been invested with several smart features – not least its ability to meet both Stage IV/Tier 4 (construction) and Euro 6 emissions regulations – it's well worth examination.

Like its smaller Cursor stablemates, the Euro 6 Cursor 16 was co-developed by FPT's R&D teams in Arbon, Switzerland, and Turin, Italy. Like the others, it will also be built at its Bourbon Lancy plant, in France. So it's no surprise that, just as the smaller Cursor 13, Cursor 16 clears the Euro 6 fence using SCR (selective catalytic reduction) – unlike the vast majority of Euro 6 truck engines. FPT says its HI-eSCR (high efficiency SCR) system reduces NOx emissions by more than 95%.

18-litre performance

Measuring 1,378 x 1,010 x 1,326mm for the most powerful version, Cursor 16 also has almost the same dimensions as the 12.9-litre Cursor 13 and is just 60kg heavier, with the same air-handling system, too. Bore and stroke are 141 and 170mm. Those figures prompt FPT to declare that it delivers "18-litre performance in a 13-litre package".

Cursor 16 also comes with single- or dual-stage turbochargers, depending on output. Single turbo versions are available from 653–775bhp, with torque from 2,990 to 3,320Nm. The twin-turbo offers whopping outputs of 707–857bhp and up to 3,500Nm torque. According to FPT, the new engine has "improved performance and durability, designed to deliver performance for heavy load, with the second stage [turbo] version offering a fuel advantage in high load factor operations".

On dual-stage turbocharger versions, the turbos operate sequentially (no bypass), with the smaller unit providing low rpm responsiveness, while the larger turbine delivers maximum boost at high rpm. On its single-turbocharger Cursor 16 engines, FPT installs a smaller, fixed-geometry turbo to help overcome lag. However, to avoid over-speed, a waste gate lets a proportion of the exhaust gases bypass the turbocharger once maximum pressure

power

is reached. For the first time, FPT is also using ball bearings for its turbochargers, allowing the engine maker to claim tighter tolerances, so "improving the performance of turbochargers at low speeds".

Cursor 16 is the first FPT engine to come with a CGI (compact graphite iron) cylinder head and liners, which the firm says increases thermal and mechanical resistance – and again improves engineering tolerances and hence efficiency. Like MAN's D38 (*Transport Engineer*, August 2014, page 20), Cursor 16 also has steel pistons (previous Euro 5 engines used alloy), which are less prone to expansion issues. Yet again, the benefit is tighter tolerances and hence higher peak pressures, resulting in higher power density and also a claimed reduction in particulate emissions.

Crowning glory

Additionally, the piston crowns feature FPT's in-house developed double re-entrant combustion bowl, which creates two vortices. These are said to ensure accurate control of the fuel-air mix, in turn maximising performance and minimising emissions, while ensuring no residual fuel on the cylinder linings.

As with its smaller Cursor siblings, the four valves per cylinder Cursor 16 has a so-called third-generation common rail fuelling system, operating at up to 2,200bar. The common rail reservoir and pipework are all enclosed within the rocker cover. Consequently, the new engine looks very clean. A rear gear train timing system has also been adopted to reduce engine noise and vibration.

Notwithstanding Cursor 16's clearly impressive credentials, it begs the question does Iveco really need it? Based on likely sales volumes, the answer is probably not, especially as the most powerful Cursor 13 engine in Stralis Hi-Way already provides up to 560bhp. Further, ensuring sufficient cooling for a 600bhp-plus Cursor 16 beneath a Stralis cab would require additional engineering time (and money) that might be more profitably spent elsewhere. And then there's the not insignificant matter of creating a drivetrain to match it.

Ironically, there is one Iveco model that might provide a home for Cursor 16 – its bonneted PowerStar 7800 tractor (pictured left), designed and built in Australia for road trains carrying up to 140 tonnes gtw. While PowerStar already has Cursor 13 as an option, for any operator wanting more than 560bhp, Iveco relies on Cummins' 15-litre ISX/Signature. Running at those down-under gross weights, large-displacement diesels like Cursor 16 begin to make more sense. TE