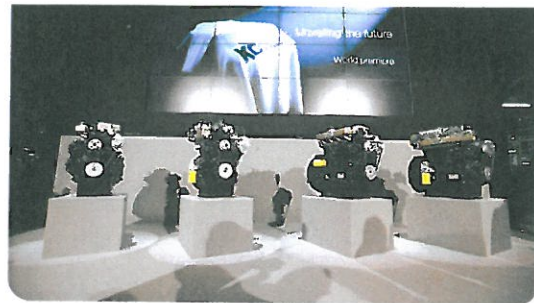




Production of the new engines will begin in September 2012.

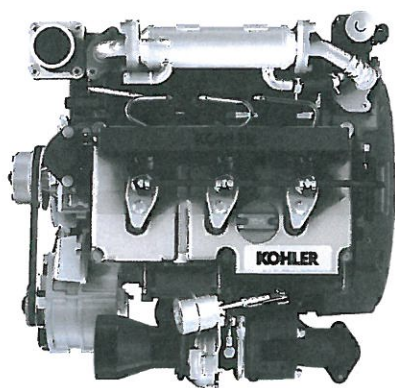


# Low level Lombardini

Lombardini's new engine range has been designed to give very low emissions, more power and reduced fuel consumption. Alan Guthrie attended the launch event in Italy.

When EHN previously visited the Lombardini engine factory at Reggio Emilia, in northern Italy, back in 2002, the company was launching a new range of diesel engines designed for low emissions.

Not surprisingly, given the on-going importance of green issues, it has



continued its research in this area, and in October the factory was the venue for the unveiling of its latest products -

another range of low-emission water cooled engines, but designed to meet the stringent requirements of the forthcoming Tier IV emission regulations.

KDI engines are claimed to reduce noise and vibration, and to improve fuel economy.

From 1 January 2013, the regulations will be introduced for diesel engines in the power range from 19 to 56kW (18.7 to 75hp) in the US, and from 37 to 56kW (49.6 to 75hp) in Europe. These require particulate emissions to be reduced to a level that is one tenth of the present limit value.

As Engineering Director Giuseppe Duri explained, Lombardini set itself the challenge of achieving this reduction without using solutions such as diesel particulate filters, which can be expensive to buy and maintain, bulky, difficult to fit and affect fuel economy. Backed by the resources of its US parent, Kohler Co, which acquired Lombardini in 2007, the manufacturer aimed to produce a completely new series of heavy-duty engines.

Project Manager Massmiliano Bonanni said that, to achieve very clean combustion, "we chose the latest generation, high pressure (2000 bar injection) common rail system to create a very fine and highly penetrating spray in the combustion chambers. To optimise the air-fuel mixture, we selected a four valve per cylinder architecture so that the injectors can be installed in a central, vertical position and to improve air intake flow."

He added that the adoption of a waste-gated turbocharger helps reduce particulate matter output, and that NOx (mono-nitrogen oxides) formation, arising from the cleaner combustion and high temperatures, is controlled by cooled exhaust gas recirculation (EGR), managed by the engine's electronic control unit. The EGR valve is

located upstream of the cooler to prevent valves sticking, and the exhaust gas is cooled through a two stage system, comprising a gas flow inside the cylinder head and a main liquid cooler.

Lombardini claims that the system, called Kohler Direct Injection (KDI), provides more power, meaning that smaller engines can be fitted to machines to achieve similar performance, with benefits of lower levels of emissions, noise and vibration, and improved fuel economy.

New 1.9 and 2.5 litre KDI engines, with maximum outputs of 42 and 55.4kW (56.3 and 74.2hp) will go into production next September, and will be available with Kohler or Lombardini branding. A 3.4 litre, 100kW (134hp) engine is scheduled for manufacture by the end of 2014, the first time that Lombardini will have manufactured engines in this power class. All models will also be available in versions with mechanical injection, for different market requirements.

Lombardini MD Giuseppe Bara believes that the KDI engines will appeal strongly to manufacturers of many kinds of equipment, in markets including construction, materials handling, power generation, agriculture and powered access, and for machinery such as mini excavators, telehandlers, loading shovels and mobile elevated work platforms.



Modern robotic machinery is used at the Reggio Emilia factory.

The KDI range is the result of a three year programme funded by Kohler Co to the tune of €30m. The manufacturer deserves credit for maintaining its product development and investment throughout the economic downturn, and could reap the rewards as the tighter emissions regulations come into effect.

01865 863858 [www.lombardini.it](http://www.lombardini.it)