

## Internal control system

Business performance in  
the DEUTZ Group

3.2 per cent. Italy also moved out of recession, expanding by 0.8 per cent. There was also positive news from France, where the economy grew by 1.1 per cent.

As in 2014, the US economy was one of the major drivers of global economic growth. It expanded by 2.5 per cent (2014: 2.4 per cent) thanks, in particular, to favourable conditions in the labour market.

At 6.9 per cent, the pace of growth in the Chinese economy continued to slow. This trend is set to continue in the years ahead. Conditions remained difficult in the truck and construction equipment sector, which is a core market for DEUTZ. The Russian economy slipped into recession due to the crisis and sanctions; the growth engine was still not running smoothly in South America either.

**Weakness in DEUTZ's customer industries** Demand in our main customer markets fell in 2015. According to DEUTZ's own estimates, demand for construction equipment – excluding the effect of the advance production of engines – was down by around 10 per cent in Europe and was unchanged year on year in North America. In China, however, demand fell by around 44 per cent<sup>1)</sup>. According to the VDMA<sup>2)</sup>, the agricultural machinery sector in Europe contracted by 8 per cent in the year under review. The market for medium and heavy-duty trucks contracted by 29 per cent in China<sup>3)</sup>.

## IMPACT OF ECONOMIC CONDITIONS ON BUSINESS PERFORMANCE

**DEUTZ suffering from customers' reluctance to invest** Whereas the global economy grew by 3.1 per cent in 2015, DEUTZ's revenue fell by 18.5 per cent and its unit sales by 29.8 per cent. The even greater decrease in unit sales was due to the growing proportion of unit sales accounted for by higher-value engines. Overall, most of our key customer sectors experienced significant negative growth. DEUTZ's performance was therefore similar to that of its customer sectors.

The economy in the eurozone expanded by 1.5 per cent in the year under review. DEUTZ's key customer sectors in this region did poorly, however: volumes in the agricultural machinery sector were down by roughly 8 per cent, for example, and demand for construction equipment declined by around 10 per cent. Furthermore, European customers drew on their inventories of the engines that they had purchased on a large scale in 2014 in anticipation of the new emissions standard. DEUTZ's revenue in our biggest market, EMEA (Europe, Middle East and Africa), went down by 27.6 per cent in 2015; the decrease in unit sales was 38.6 per cent. US economic output grew by a relatively strong 2.5 per cent in 2015, and demand for construction equipment in North America was at the same level as in 2014. Our unit sales in the Americas region fell by 11.0 per cent, but we were able to increase our revenue by 7.3 per cent. Momentum in China, our key international market, continued to slow, with economic growth of 6.9 per cent year on year. In this environment,

the markets for construction equipment and medium and heavy-duty trucks declined by approximately 44 per cent and 29 per cent respectively. By contrast, DEUTZ's revenue rose by 18.8 per cent and its unit sales by 14.4 per cent in the Asia-Pacific region. However, the revenue generated by our DEUTZ (Dalian) Engine Co., Ltd. joint venture, which is not included in consolidated revenue, dropped by 5.6 per cent year on year; its unit sales were down by a substantial 29.5 per cent.

## RESEARCH AND DEVELOPMENT

### Research and development expenditure (after deducting grants)<sup>1)</sup>

€ million (R&D ratio in %)

2015	40.8	(3.3)	
2014	53.1	(3.5)	
2013	52.6	(3.6)	
2012	62.1	(4.8)	
2011	84.6	(5.5)	

<sup>1)</sup> Spending on research and development after deducting grants received from major customers and development partners.

**R&D spending scaled back as planned** Expenditure on research and development in 2015 amounted to €49.5 million (2014: €68.7 million). After deducting grants received from major customers and development partners, expenditure was €40.8 million (2014: €53.1 million). The R&D ratio (after deducting grants), i.e. the ratio of net development expenditure to consolidated revenue, fell marginally as planned to 3.3 per cent (2014: 3.5 per cent). This decrease in R&D expenditure was largely due to all engines for the latest emissions standards, EU Stage IV/US Tier 4, having been launched in the market in 2014. In the year under review, 31.9 per cent of development expenditure after deducting grants was capitalised (2014: 49.5 per cent).

Spending by the DEUTZ Compact Engines segment after deducting grants came to €38.2 million (2014: €48.1 million) and that of the DEUTZ Customised Solutions segment came to €2.6 million (2014: €5.0 million).

**Stage V ready** During previous years, we had completely overhauled our engine portfolio for the EU Stage IV/US Tier 4 emissions standards. This has resulted in very compact engines, featuring low lifecycle costs and exhaust aftertreatment designs tailored to customer needs. Our engines in the 2.9 to 7.8 litre cubic capacity range that are equipped with diesel particulate filters already meet the next European emissions standard, EU Stage V, which is expected in 2019<sup>4)</sup>. There are currently no plans for a further emissions standard in the USA.

<sup>1)</sup> China Construction Machinery Association, January 2016; own estimates.

<sup>2)</sup> Konjunkturbulletin of the German Engineering Federation (VDMA), November 2015.

<sup>3)</sup> China Automotive Information Net, January 2016.

<sup>4)</sup> The EU Commission's Stage V proposals as published on 25 September 2014.

We do not anticipate being faced again with such a complex challenge as that presented by the EU Stage IV/US Tier 4 emissions standards in future; rather, we expect to be able to market these engines well into the next decade. Going forward, developments will be influenced to a lesser extent by emissions legislation and, instead, will be driven by business decisions to a greater degree. We will continue to strive for technologically leading designs and to further improve the performance of our engines without increasing their size in future.

**Expansion of the product portfolio** We intend to enhance our product range with further developments. One of these is the TCD2.2, a three-cylinder engine that we are developing on the basis of the existing four-cylinder engine with a 2.9 litre capacity. In addition, we will offer smaller engines not only in a diesel variant but also in a liquefied petroleum gas (LPG) variant. The latter is a particularly interesting option for forklift trucks and other material handling applications.

**Preliminary development work at a high level** Exhaustive research and development will continue to provide the bedrock for DEUTZ's position at the forefront of innovation within the sector. Following the successful completion of work on the latest emissions standard, we can now turn our attention to other matters. The focus will be on electronics and software development as well as the enhancement of our exhaust aftertreatment technology in order to further reduce the space required for its installation.

**New technical designs** We are constantly developing new, innovative approaches and have recently expanded our activity in the field of alternative fuels. For example, we have developed the prototype for an engine powered by compressed natural gas (CNG), based on the TCD 3.6, and fitted it in a tractor. We carried out this project, which was supported by the German Foundation for the Environment, in cooperation with the University of Rostock and the SAME DEUTZ-FAHR Group. The tractor was showcased at Agritechnica in Hannover in November 2015.

**Intellectual property rights safeguard our know-how** We protect our know-how from unauthorised outside use by means of patents, patent applications and utility models. In 2015, we submitted 19 new patent applications, seven of which were in Germany. We now hold a total of 153 patents registered in Germany and 262 registered elsewhere.

## PROCUREMENT

In 2015, purchasing continued to focus on improving the competitiveness of the engine portfolio by reducing material costs. We took decisive action as part of our defined material group strategies, primarily in relation to the model series in the segment for engines with capacities of up to four litres. Requirements for security of supply and supplier performance were further tightened, too.

**Fall in commodity prices** The price of cast-iron scrap continued to fall sharply in the year under review. The decrease in aluminium and copper prices was less pronounced. Platinum prices were significantly lower compared with previous years. The price of palladium followed a similar trajectory in 2015, although this element is far less important to DEUTZ than platinum. All average annual values lay below the range we had forecast. Overall, commodity prices have only a limited influence on the procurement prices for parts from suppliers because there is a very high element of value added.

Since the introduction of Tier 4, the proportion of product categories accounted for by EAT components has been rising. Nonetheless, foundry products (particularly cylinder heads and engine blocks), fuel injection equipment (predominantly pumps and valves) and measurement & control devices (for example mechanical and electronic regulators and sensors) make up the bulk of the overall volume of materials purchased.

Last year, we particularly focused on the procurement strategies for fuel injection, ECU, EAT and AGR. The more technology-intensive components have developed rapidly in recent years. Price structures have therefore changed over the past five years, and what were once new market players are becoming established suppliers. A structured process for selecting suppliers, conducting negotiations and awarding contracts has enabled us to avoid competitive disadvantages and ensure we have chosen the right strategic partners.

We have stepped up our level of procurement from emerging markets because prices in the manufacturing sector are coming under slight pressure as a result of the Chinese economic slowdown. We took advantage of this situation and were thus able to further reduce costs.

**Supplier performance stabilised at a high level with further improvements** Close collaboration between logistics and purchasing enabled us to improve average supplier performance over the year, with this metric rising by three percentage points compared with the previous year to over 97 per cent. This meant we largely avoided extra costs caused by short-term under-supply or delays.

**Enduring improvement in supplier quality** Our parts per million (ppm) rate as a performance indicator for defective parts was below 1,000 ppm for the fourth year in succession and thus remained at a historical low. This success is due to the rigorous and ongoing monthly evaluation of suppliers as well as the implementation of measures to improve supplier quality.