MAHLE

Driven by performance

Press release on the business development in the 1st half of 2010 and outlook for the MAHLE Group

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1. Business environment/economic situation in the automotive industry

Global economy recovers more quickly than expected

In the OECD area, economic output increased for the first time in five quarters, with a rise of 2.5 percent in the first quarter in comparison with last year. With the economy recovering more quickly than expected, the OECD raised the growth forecast for 2010 significantly; the OECD currently anticipates a rise of 2.7 percent.

In Germany, this development is primarily driven by exports and public investments connected with the economic stimulus package. In Japan, the main impetus for economic development is also provided by exports to emerging markets, particularly to China. In the USA, investments to maintain and repair investment goods, which had been neglected recently and are now being resumed, and the necessary measures to build up inventories are having a positive impact on industrial output. Overall, the economic situation in the automotive industry has also improved further. While development in Europe continues to be characterized by a number of uncertainties, the markets in Asia—particularly China—and in the NAFTA region are showing a significantly positive trend. At 67.7 million passenger cars and light commercial vehicles, the current forecast for 2010 exceeds the previous year's value by 16 percent.

Europe

In Europe, the production of passenger cars and light commercial vehicles apparently bottomed out in 2009 at 16.3 million units. Despite the sales promotion measures largely coming to an end in most European countries, it is now anticipated that the production of passenger cars and light commercial vehicles for 2010 will slightly exceed the previous year's value, with 17.0 million units. One of the reasons for this development is the increase in passenger car sales in Russia as a result of purchase incentives, which will

cause Russian production to grow by 0.3 million units to 0.9 million units this year. The production of passenger cars and light commercial vehicles in Western Europe is expected to exceed the previous year's value by three percent, reaching 12.1 million units in 2010.

NAFTA region

Following the exceptionally heavy decline in 2009, the production of passenger cars and light commercial vehicles in the NAFTA region is undergoing an unexpectedly fast recovery this year. Accordingly, the forecast for 2010 has now been raised significantly. The production of passenger cars and light commercial vehicles is currently expected to be 3.0 million units (+35 percent) above the previous year at 11.6 million units. Both the Asian and the German manufacturers are benefiting from this development to a disproportionately strong degree.

Asia/Pacific

With an increase of 5.3 million (+19 percent) in comparison with the previous year, resulting in a total of 33.1 million units, the Asian countries are once again the primary growth driver worldwide, and are responsible for almost 50 percent of the global production of passenger cars and light commercial vehicles in 2010. This development is primarily driven by China, where vehicle production is expected to increase by 2.2 million units to 13.8 million units this year. This makes China by far the biggest producer of passenger cars and light commercial vehicles in 2010. Significant increases are also expected for Japan (+15 percent to 8.8 million units), Korea (+12 percent to 3.8 million units), India (+31 percent to 3.2 million units), and Thailand (+51 percent to 1.5 million units).

MERCOSUR region

Supported by a stable domestic economy in Brazil, the production of passenger cars and light commercial vehicles in the Mercosur region is, to a large extent, developing independently of the worldwide economic

turbulence. For 2010, the production of passenger cars and light commercial vehicles is expected to reach 4.0 million units, i.e., 0.3 million units (+9 percent) above the previous year.

Forecast for commercial vehicles also raised

In view of the significant increase in demand, especially in China, the current forecast for commercial vehicles has also been raised. It is now anticipated that the production of commercial vehicles and buses will increase by 0.4 million units in comparison with the very weak previous year to 2.8 million units (+17 percent) in 2010.

Europe

For the European market, whose stock of commercial vehicles has been reduced considerably in recent years and which was hit particularly hard by the negative effects of the economic crisis, a production increase of eight percent in comparison with last year's very low level is now expected. This rise in comparison with the previous year is primarily due to the production increase in Eastern Europe (+19 percent). In Western Europe, the increase of three percent in production is supported primarily by Germany, where a volume increase of 3,000 units was recorded.

NAFTA region

For the NAFTA region, a recovery of eleven percent in comparison with the previous year is now expected, resulting in a figure of 333,000 units following the severe declines in 2008 and 2009. The demand for heavy commercial vehicles is increasing more rapidly than the demand for medium-weight commercial vehicles.

Asia/Pacific

With an increase of 315,000 in the production of medium-weight and heavy commercial vehicles, which reached 1,929,000 units (+19 percent in comparison with the previous year), the Asian manufacturers also made the strongest contribution to the positive development in the commercial vehicle market. China (+13 percent to 1,312,000 units), India (+42 percent to 341,000 units), and Japan (+49 percent to 162,000 units) made significant contributions to this growth.

MERCOSUR region

As a result of the continuing positive economic development in South America, it is currently anticipated that the production of commercial vehicles will exceed the previous year's value by 25 percent, reaching 212,000 units.

2. Business development in 2010 and outlook

In the first six months of the 2010 business year, Group sales exceeded the previous year's value by EUR 683.6 million (37.6 percent). First consolidations contributed EUR 7.8 million to sales by the end of May. Exchange rate effects relating to the value of the euro against the U.S. dollar, Brazilian real, and Japanese yen also had a positive effect on reported sales in the amount of EUR 79.0 million. The adjusted organic change in sales thus amounted to EUR 597.1 million (32.8 percent).

While these figures are pleasing at Group level, they should be interpreted differently when considered at a regional level. Taking the first half of 2008 as the basis for comparison—as this was the last "normal" period before the onset of the global financial and economic crisis—reveals significant structural changes in the composition of Group sales. While MAHLE achieved 56 percent of its sales in Europe in the first half of 2008, this proportion fell to 48 percent in the first half of 2010. In absolute terms, this means that the European sales of around EUR 1.5 billion have fallen to EUR 1.2 billion. In the same period, the proportion achieved in Asia and South America rose from 27 to 35 percent. These figures show very clearly where the automotive industry's growth markets are, and that MAHLE made the right decision to invest in these markets at an early stage. MAHLE can now benefit fully from these markets, not only through sales but—to an even greater extent—through an above-average contribution to profit in comparison with the other regions.

MAHLE is thus still a long way from the positive "precrisis situation" in Europe, despite the pleasing increase in sales, and must continue to make every effort to adjust its costs to the diminished market environment. Therefore, as a precaution, an agreement was reached with the employee councils to allow general use of the short-time work mechanism in Germany for the second half of 2010.

The growth in sales is expected to be considerably lower in the second half of 2010; nevertheless, we anticipate a general stabilization of the markets. Overall, we envisage potential total annual sales of around EUR 4.9 billion, which would correspond to sales growth of around 27 percent in comparison with 2009. However, this would require a stable sales level during the second half-year.

Supported by the significant sales growth in combination with the cost reduction and structural measures initiated in 2008/2009, we succeeded in returning to profitability in the first half of 2010, with Asia and South America making particularly strong contributions to this pleasing development. With stable development in sales, we also anticipate a clearly positive development of revenue in the second half of 2010.

However, MAHLE not only responded to the crisis with cost and structural adjustments, but also used the time to further improve its strategic position for the long term. With its participations in Behr Industry and the Behr Automotive Group, MAHLE will be in a position to participate in the high-growth business segment of energy-efficient thermal management—in both its automotive and industrial activities.

The number of employees as at the reference date of June 30, 2010, was almost unchanged in comparison with the previous year, rising from 44,431 to 44,799.

Compared to the previous year, the number of employees in Germany fell from 8,804 to 8,440. This figure will increase by around 950 employees as a result of the full consolidation of MAHLE Behr Industry from July 1, 2010. In the first half of 2010, the amount of short-time work was progressively reduced because of the improvement in our customers' order and demand levels and the resulting greater utilization of capacities in our plants. For certain plant and functional divisions, however, we had to reach an

agreement to extend the short-time working arrangements, as the sales allocated to these divisions have not yet reached precrisis levels.

In May this year, MAHLE concluded a "Supplementary labor agreement for safeguarding employment and introducing a new remuneration structure" for the German locations. The agreement supersedes the supplementary agreement from 2005, which has expired. The key points of the new agreement include measures to safeguard employment such as abstaining from compulsory redundancies until March 31, 2013, as well as employee contributions to safeguarding employment with revised rules for the calculation of the performance-related bonus and a postponement of the 2011 pay scale increase. In addition, we were able to agree on improvements to the arrangements for partial retirement, subsequent employment of apprentices for an indefinite period, and the establishment of production and service companies to take on employees affected by restructuring measures. By concluding this agreement, we have succeeded in creating an extensive package of measures aimed at sustainably improving our profit situation and safeguarding jobs in Germany.

3. Development of the MAHLE Group

The significant milestones of the MAHLE Group's development in the 2010 business year were the following:

June 2010

MAHLE takes over majority share in Behr Industry
On February 4, 2010, MAHLE GmbH and Behr GmbH & Co. KG concluded an agreement for the acquisition of 60 percent of the shares in Behr Industry GmbH & Co. KG by MAHLE GmbH. The responsible antitrust authorities have now approved this acquisition, and it was completed on June 30, 2010.

In 2009, the industry division of Behr Group achieved sales of 178 million euros and currently employs approximately 950 employees in five locations in Germany and the USA. Its main products are cooling and air conditioning systems for railway and special vehicles, buses, ships, construction and agricultural machinery, the aviation industry, and stationary heavy duty engines for power generation. Since July 1, 2010, Behr Industry has traded under the name MAHLE Behr Industry.

MAHLE has integrated the company MAHLE Behr Industry into its existing industrial activities with regard to large engines and industrial filtration. These activities will be bundled in the new business unit “Industry” with an annual sales volume of approximately 500 million euros.

July 2010

MAHLE and Behr sign share agreement
As announced on July 26, 2010, the two large Stuttgart automotive suppliers MAHLE and Behr have agreed that MAHLE will acquire shares in Behr in several stages.

The two first stages of the participation will be covered by a unilateral capital increase by MAHLE. In the first stage (2010) MAHLE will take on 19.9 percent of shares; in the second stage, at the beginning of 2011, the participation will be increased to 36.85 percent. The contract also provides that MAHLE can purchase additional shares from the current shareholders by exercising a call option starting in 2013, and can thereby take over the majority of Behr. It also provides current BEHR shareholders with the potential to then sell their shares to MAHLE in several steps over a period of ten years.

MAHLE's participation in Behr opens up significant additional potential for the future of both companies in the market for complete systems solutions for the power train of modern passenger cars and commercial vehicles. The product portfolios complement each other and fit together excellently. Examples include complete exhaust gas recirculation modules and intake systems with integrated charge air coolers. In addition, the subject of "efficient thermal management," including heating and cooling, is particularly significant for new generations of vehicles, as fuel consumption and CO_2 emissions are further reduced. This can also be seen in conjunction with the increasing significance of alternative drive systems, from hybrids to vehicles with purely electric or fuel cell drive systems.

While MAHLE and Behr are expected to achieve total sales of around EUR 8 billion in 2010, potential sales of around EUR 10 billion are envisaged in the medium term, thanks to the complementary product portfolio and the associated systems and modular approaches. Products in the Industry and Aftermarket divisions are also expected to contribute substantially to this sales growth.

After closing of the transaction, it is planned that MAHLE's Managing Directors Prof. Dr. Heinz Junker and Dr. Bernhard Volkmann will be appointed as new members of the Behr Supervisory Board.

4. Preview of the IAA 2010

At the IAA 2010, MAHLE will primarily present its activities in the following technology areas offering outstanding potential for optimization:

- Innovative cooling and air-conditioning solutions by MAHLE Behr Industry
- Exhaust gas recirculation combined with reduced fuel consumption
- State-of-the-art mechanical system lowers CO_2 emissions
- Filtration is environmental protection

Innovative cooling and air-conditioning solutions by MAHLE Behr Industry

In today's engines, thermal management plays an increasingly important role. Following its acquisition of Behr Industry, MAHLE is now active in the market of complete cooling and air-conditioning solutions for off-highway vehicles and industrial applications.

MAHLE Behr Industry supplies complete cooling and air-conditioning systems for building machines, agricultural machines, railroad vehicles, military vehicles, ships, buses, large engines, and wind power stations, to name just a few. To meet ever-stricter emission standards in off-highway applications while increasing specific output, processes both inside and outside the engine are being employed in much the same way as in the truck sector; these include cooled exhaust gas recirculation and dual-stage turbocharging with charge air cooling, as well as exhaust gas aftertreatment measures, such as SCR or diesel particulate filters.

For off-highway engines, MAHLE Behr Industry offers two technologies: one that uses exclusively exhaust gas recirculation and another that uses primarily exhaust gas recirculation plus SCR technology. The combined system is operated with an EGR recirculation rate of approximately 25 percent, resulting in very low NO_x emissions; in combination with the SCR system, future Tier IV (USA) and EURO VI (Europe) emission standards can

reliably be undercut. The alternative technology with EGR-only engine operates with an extremely high recirculation rate of up to 40 percent, consequently also producing extremely low NO_x emissions. Future emission standards can thus be fulfilled without an additional SCR system—even in large-volume diesel engines in locomotives and ships with power outputs greater than 560 kilowatts.

The cooling system in both scenarios comprises two circuits. The first circuit cools the engine and the high-temperature EGR cooler. A second, independent, lower temperature circuit dissipates the heat of the second EGR cooler and of the two charge air coolers. Indirect cooling of the charge air presents several advantages: the engine reaches the operating temperature more quickly, the pressure losses are up to 50 percent lower, and it is possible to connect additional cooling elements to the low-temperature circuit.

In addition, MAHLE Behr Industry will present a new, innovative air-conditioning solution for buses. Thanks to intelligent lightweight design, the front box weighs only 16–17 kilograms, only half as much as the previous solutions. Besides providing air conditioning to the driver and co-driver seat, the front box also maintains a fog-free windshield; the air and heat performance is more than 50 percent higher than for large-volume cabins in long-haul trucks.

Exhaust gas recirculation combined with reduced fuel consumption

Better fuel economy and lower pollution emissions are top priority on the development agenda. With innovative demand-controlled exhaust gas recirculation, MAHLE is able to reduce NO_x emissions while lowering fuel consumption.

This technology requires high-capacity, generally dual-stage, cooling of the recirculated exhaust gas and a high-performance particulate filter. Even so, this concept is the most cost-effective comparatively, and is the easiest to integrate into any vehicle or engine combination.

However, the volume of the EGR air mass is limited by the pressure gradient between the exhaust gas line and charge air line—a pressure gradient that is not always sufficient for the required high EGR rates, particularly at low engine loads and speeds. To achieve the required EGR rates of approximately 40 percent, the charge air mass flow in conventional technology must be throttled; this increases fuel consumption due to greater charge exchange losses.

For this reason, MAHLE developed a fast-switching charge air valve (SLV), which replaces the conventional throttle valve. A brushless DC motor is responsible for driving the continuously rotating flap in synchronism with the engine speed. This not only ensures higher EGR rates of up to 50 percent; it also lowers the entire maximum pressure and temperature levels, thereby lowering NO_x emissions as well. In addition, by decreasing charge exchange losses by nearly 50 percent, the MAHLE SLV provides significant consumption advantages compared to a conventional high-EGR solution with a throttle valve. SLV technology has already been tested successfully by commercial vehicle customers for diesel engines with different supercharging concepts.

State-of-the-art mechanical system lowers CO_2 emissions

Lightweight composite camshafts fitted with low-friction rolling bearings offer significant CO_2 savings potential in commercial vehicle engines.

For decades, MAHLE has been a large-scale supplier of assembled camshafts for passenger cars, including its variable MAHLE CamInCam® with variable valve opening times since 2007. MAHLE has now added

assembled camshafts for commercial vehicles to its product portfolio. Assembled camshafts are built to withstand high mechanical loads and offer a great deal of freedom in terms of the materials and design used for the driving elements and output elements. Additional positive traits include increased contact pressure between the cam and cam follower as well as significant weight advantages.

Compared to an all-steel camshaft, an assembled camshaft is approximately 50 percent lighter. MAHLE has already gleaned experience with assembled commercial vehicle camshafts in a number of customer projects, has tested these under near-series conditions, and developed corresponding production processes. Moreover, assembled camshafts made according to MAHLE's production process offer ideal prerequisites for implementing a low-friction rolling bearing mechanism. The special needle bearings have minimal space requirements and reduce the mechanical bearing friction by up to 40 percent. In addition, they do not require a supply of pressure oil, since the oil mist present in the cylinder head provides all the necessary lubrication. Consequently the oil pump delivery rate can be reduced. Overall, this concept of an assembled camshaft with rolling bearing allows a reduction in fuel consumption of approximately two percent.

Filtration is environmental protection

The environmental compatibility of commercial vehicle diesel engines is defined primarily by an optimal combustion process with low pollution emissions. However, other media in the engine must also undergo intensive treatment with a view to sustainable environmental protection—the fuel and engine oil, for example.

MAHLE provides innovative, environmentally friendly filtration systems to separate out unwanted materials. One such system is the world's first electrical cone stack separator, which employs a highly efficient method to separate oil out of the blow-by gas in the crankcase ventilation system.

Acting as the drive is a brushless DC electric motor with an internal-rotor design, which generates speeds of up to 10,000 revolutions per minute depending on the operating map. The separator unit mainly consists of a rotor on which conical disks are arranged on top of each other and connected in parallel. When the blow-by gas flows through the disk gap, the oil mist deposits on the disks. The oil drops are moved radially outward by centrifugal acceleration due to their higher density and are directed toward the separation element. None of the moving parts require sealing elements, and the system is designed for a service life of over 1.2 million kilometers, or 24,000 hours of operation.

MAHLE developed the BlueDrain® system as a way to dispose of the water in diesel fuel automatically. A special concept of action based on activated carbon purifies the water to such a degree that it can then be safely discharged into the environment. The automatic water disposal feature is especially important because fuel filters are often located in hard-to-reach areas, and also because it rules out the possibility of incorrect operation. Because the electronic control unit registers the number of cleaning operations the BlueDrain® system carries out, an OBD (on-board diagnosis) function is also available.

In addition to highly efficient standalone systems, MAHLE also offers perfectly harmonized, multifunctional filtration solutions, such as cylinder head covers with integrated auxiliary features. These primarily seal the oil-coated camshaft chamber off from the outside, but increasingly include integrated oil mist separators with a pressure controller, blow-by heaters, electric actuators, oil filler nozzles, sensors, and line attachments. Robust plastic materials help reduce weight and are also used as walking and standing surfaces. This modular approach (fewer parts, interfaces, and weight) not only improves functionality, it also substantially contributes to lowering costs.