



## International Automotive Press Briefing in Boxberg: Bosch technology is making automobiles around the world even safer, cleaner, and more economical The vision: low-emission and accident-free driving

June 2007

PI 5877 UBK KI/Vi

- ▶ Major up-front investments in research and development are paying off
- ▶ Tighter environmental regulations ensure growth in international demand for highly efficient automotive drive technologies and exhaust gas treatment
- ▶ Networking safety systems results in fewer accidents and fewer injuries
- ▶ Bosch predicts sales of approximately one billion euros by 2010 from equipping of low-price vehicles

Stuttgart – The Bosch Group anticipates that the growing international demand for safer, cleaner, and more economical vehicles will benefit its automotive technology business: “We offer an entire range of products and developments that help to achieve a further significant reduction in pollutant emissions while improving safety standards in measurable terms. This is why we expect a major boost for our international business over the years ahead,” explained Dr. Bernd Bohr, member of the Bosch board of management and chairman of the Automotive Group, at the 58<sup>th</sup> International Automotive Press Briefing in Boxberg, Germany. Ongoing, large-scale, up-front investment in research and development pays particularly high dividends: “We are active in exactly the right technological fields. Our innovative technologies put us in a position where we can play a central role in shaping the future of the automobile in many key areas,” commented Bohr.

The automotive press briefing, which was attended by a total of some 350 journalists from 35 countries, focused on drive and exhaust gas treatment systems, safety and comfort systems, and product concepts for the rapidly growing low-price vehicles market. “Working in partnership with our customers as an independent, international, and innovative systems supplier, we are ideally placed to develop complex technologies that will protect the environment and raise safety standards, and to get them off the drawing board and onto the road. Our slogan ‘Invented for life’ sums up this mission perfectly,” continued Bohr.

### **Large-scale, up-front investment in the automobile of the future**

It is a tradition at Bosch that innovations take top priority. Indeed, in 2006, the company spent over 2.7 billion euros on research and development in the Automotive Technology business sector alone. That equates to roughly 10 percent of the 27.2 billion euros in sales achieved in this sector – a share that is far higher than the industry average. Research and development expenditure also for 2007 is expected to be equivalent to some ten percent of sales. Close to half these investments in the future will benefit systems that directly help to conserve resources and protect the environment. Bohr: “Step by step, our long-term objective must be to even further reduce the CO<sub>2</sub> emissions caused by road traffic. That is why we are also adapting our injection systems for biofuels and working on fuel-cell technology as well as on battery-supported automotive drive concepts, to name only a few examples.”

Bohr emphasized that it is increasingly automotive suppliers that have to bear the brunt of the considerable up-front expenditure associated with this work. “Both sides – suppliers and automobile manufacturers – need to see themselves as partners in innovation. A partnership like this calls for a long-term mindset and the realization that the payback time for development costs must not be postponed into the distant future,” Bohr commented. After adjusting for currency effects, the company anticipates sales growth of around four percent for its automotive technology business in 2007. The Automotive Technology business sector accounts for around 62 percent of overall Bosch Group sales and employs approximately 160,000 associates at 120 locations in 25 countries. Nearly 19,000 engineers are working at 50 development centers around the world.

### **Big growth for a small price – new products for low-price vehicles**

The primary regional growth drivers are the emerging Asian markets, where automobile production is expected to grow by an average of around six percent over the next eight years. In contrast, the growth rate in the traditional manufacturing regions of North America and western Europe could amount to just one percent. “We will adapt to this structural shift by continuing to use innovations to take advantage of every possible growth opportunity in the traditional industrialized countries. At the same time, we will reinforce our investments in the new growth markets – started while these markets were still at a very early stage in their development – particularly in the areas of manufacturing and development,” stated Bohr. Bosch has already laid solid foundations for its strategy: “We already manufacture over seven million gasoline injection nozzles and more than one million gasoline pumps each year in China,” explained Peter Pang, who is responsible for Bosch’s business in China. The rapidly growing low-price vehicles segment also represents a major focal point of the company’s strategy. In the period up to 2014, the unit sales for cars marketed at a net price of less than 7,000 euros are expected to grow at an annual rate of five percent – more than twice the growth rate for unit sales of other vehicles.

“In 2010, we expect to achieve sales of one billion euros from equipping low-price vehicles with our products and solutions,” stressed Bohr. That corresponds to a market share of around 25 percent in this segment. “Suppliers looking to get a piece of the action in this strong growth environment need to adapt to new technology and pricing challenges,” explained Wolf-Henning Scheider, president of the Gasoline Systems division. He used Value Motronic to illustrate his point. From the very outset, the development and manufacturing costs of this new control unit platform for gasoline engines were kept to a minimum. As a result, moving into this new market segment benefits Bosch in two ways: “We have competitive products and can incorporate the know-how we have acquired into product development for other classes of vehicles,” continued Scheider.

### **Efficient drive systems save money and protect the environment**

Bosch also anticipates that tighter international environmental regulations will provide further growth impetus and is gearing up for an increased demand for cleaner and more economical technologies. “We are working with our engineers on the spot to develop appropriate solutions in all three major global regions,” Bohr pointed out. Take, for example, the diesel engine: Emissions standards in the emerging markets of Asia are becoming ever more stringent, meaning that electronically regulated fuel injection is essential in diesel engines. As a result, sales of common-rail diesel injection systems in India and China are expected to grow from 100,000 systems in each country in 2007 to 1.3 million by 2010. Bosch is also creating the technical conditions that will help diesel cars make a breakthrough on the U.S. market in the next few years. The AdBlue metering system Denoxtronic will help diesel engines meet the strict US07 BIN 5 emissions standard by as early as 2008. “Thanks to its eco-friendliness and cost-efficiency, clean diesel is becoming a hot topic in the U.S.,” stated Christopher Qualters, head of diesel sales in the U.S. Bosch is currently working with European, American, and Asian customers on diesel projects destined for the U.S. market and also anticipates that stricter CO<sub>2</sub> limits will encourage growth in the market share for diesel in Europe. Modern diesel engines with direct injection consume a good 30 percent less fuel and emit around 25 percent less CO<sub>2</sub> than comparable gasoline engines with port injection. “Bosch is continuing to develop diesel engine management, which will result in a further reduction in carbon dioxide emissions of up to ten percent in an engine that is already economical as it is,” explained Dr. Rolf Leonhard, executive vice president engineering of the Diesel Systems division.

At the same time, the company is working hard to further optimize gasoline engines. Combined with turbocharging, the second generation of Bosch’s gasoline direct injection systems enable reductions in engine size. This downsizing means that the same performance can be achieved with less engine displacement and CO<sub>2</sub> savings of some 15 percent compared to conventional port injectors. In 2007, Bosch will supply approximately 900,000 gasoline direct injection systems. By 2010, this figure could

already be more than two million. Bosch also sees potential for the hybrid, in other words the combination of internal-combustion engine and electric motor. “We have been awarded contracts for both gasoline and diesel hybrids,” stated Bohr. “Our components for natural gas drive and the Flex-Fuel engine management system for ethanol operation, which is so important in the North and South American markets, illustrate how diverse our efforts in this field are.”

### **The sensitive car – more technology for more safety**

As well as developing clean and economical drive systems, Bosch also focuses on technologies that make driving safe, sophisticated, and comfortable. “Our cutting-edge safety systems are an important tool in lowering accident rates in spite of rising traffic density,” Bohr explained. For example, the U.S. National Highway Traffic Safety Administration plans to mandate the electronic stability program ESP<sup>®</sup> for all new cars as from 2011. “As a result, our annual ESP<sup>®</sup> sales in the U.S. will triple to almost three million systems by 2010,” commented Bohr. Similar legislation for 2012 is currently being discussed by the European Union.

Active safety systems such as the antilock braking system ABS, the traction control system TCS, and the electronic stability program ESP<sup>®</sup> have already achieved high market penetration and are helping drivers to avoid accidents. These active safety systems also include driver assistance systems. “We are working flat out on developing the ‘sensitive car.’ This car will soon be able to see what is happening all around it thanks to sensors and ultra-high-performance electronic systems,” stated Dr. Rainer Kallenbach, executive vice president sales of the Automotive Electronics division. “The car learns to perceive and interpret its surroundings. The ‘eyes’ of the car are cameras, while its ‘feelers’ are ultrasonic and radar sensors. The car orients itself using map and positioning information from satellites or navigation systems. In this way, the driver assistance systems gain their own understanding of the driving situation,” Kallenbach continued.

Over the coming years, Bosch will gradually develop new driver assistance systems to the series production stage. “We are networking these safety and comfort systems so that they can exchange information among themselves. This allows us to create new functions – such as automatic emergency braking or the parking assistant that can maneuver itself into a parking space.” A major development at Bosch is the combination of radar and video sensor technology that aims to make the vision of accident-free driving as much of a reality as possible. “Using this approach, the ‘predictive emergency braking’ function allows us to diminish the results of accidents,” stated Kallenbach. The market launch for this system is planned for 2009. In addition, the first camera systems with intelligent image interpretation are expected to be available by 2010.

There are also new occupant protection safety functions in the pipeline. Early Pole Crash Detection, which is likely to be ready for series production by the end of 2008, offers

additional protection during the side impacts that can follow skids by ensuring that airbags and seat-belt pretensioners react quickly and accurately. Secondary Collision Mitigation also uses signals from the airbag control unit and its sensors to control ESP®. “The aim is to avoid the secondary collision that often follows the initial impact in many accidents,” explained Michael Strugala, head of development in the occupant safety business unit of the Automotive Electronics division. The market launch of this system is planned for 2009 onwards.

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