

In the wake of a deep recession:

Managing structural change in the automotive industry

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Ladies and gentlemen,

Never before has the Frankfurt Motor Show been held in such an economically difficult year. The downturn in global markets has also left its mark on our business at Bosch. While the worst of the economic turbulence seems to have passed, the structural challenges that our industry faces are becoming ever clearer: the shift of economic power to the emerging markets, the development of new drive technologies, or the ever stricter demands imposed worldwide on environmental and passenger protection, to name only a few. The automotive industry as a whole must find suitable responses to these challenges, and Bosch is determined to play its part in doing so. Above all, the issue of climate protection must and will unleash a new wave of innovations – also for the internal-combustion engine. In fact, this engine in particular, which is set to remain the dominant drive technology for many years to come, must be made more eco-friendly. So this year's Frankfurt Motor Show is taking place at a time in which the automotive industry is undergoing major change as its technology is transformed.

But there is no doubt that the recession has hit the automotive industry especially hard over the last twelve months. Our industry has been plagued by a number of burdens:

- Oil prices which remained too high for too long,
- The climate debate has a tendency to bring forth easy remedies which cannot be put on the road overnight,
- The resulting technical and political uncertainties weighing upon potential car buyers,
- And, finally, the worldwide plunge in demand as a consequence of the financial crisis.

All this led to the worst economic downturn that we have experienced in many decades. After the low point at the beginning of this year, for 2009 we expect worldwide automobile production to fall by some 15 to 20 percent. But we currently see signs of recovery, and not only because of government economic stimulus packages. After all, the various cash incentives to trade in older vehicles have had the desired effect, especially in Germany. As a supplier to the industry, Bosch has also benefited from these programs, even if only to a low degree. This is because these buyer incentive programs have stimulated demand above all for smaller cars. And these cars are not as often equipped with advanced safety systems and diesel drive technologies. This is how the share of diesel, for example, among newly registered cars in Western Europe, which in 2008 lay at a full 53 percent, has sunk to only 44 percent this year. This is still, of course, a high value, and one that is set to rise yet again. After the incentive programs have largely sparked premature sales for smaller cars, new opportunities for vehicles in the upper and premium segments will open up in 2010 – against the background of further economic recovery. What is more, these upper and premium segments have some catching up to do, since in the meantime we have a lot of upper-class cars on our roads that are simply too old. This situation coincides with an increased offering of fuel-efficient and eco-friendly drive systems. So some things will set themselves straight again, but there is no mistaking that the crisis has led to shifts in market structures.

Structural change: economy is what counts

The situation is worth taking a closer look at. For Bosch, five structural changes in the automotive market are most relevant.

These changes partly overlap:

- Firstly, **small cars** have clearly gained in significance, and this long before their demand was stimulated for political reasons. Since 1995, their share of the world automotive market has grown from 15 to 25 percent. The emergence of the Chinese and Indian markets has played a major role in this development.
- Secondly, growth in our industry is concentrated more and more in the **emerging markets**. There, demand for cars is catching up with developments in the industrialized countries. By way of comparison: for every 1000 inhabitants, in Germany there are 500 cars; in China there are 17, and in India there are 11. Growing demand in the emerging markets is focused on low-price vehicles, in other words cars selling for a net price of under 7000 euros. Worldwide sales in this segment are set to show an annual increase of some five percent until 2016, which is more than double that of the automotive market as a whole.
- Thirdly, **economy** is gaining in significance – not only when buying a car, but also when driving it. Today, efficiency is more important than driving pleasure. This is not only a consequence of the recession, but is also in the interest of climate protection. The reason is that lower CO₂ emissions are only possible with lower fuel consumption. Against this

backdrop, the share of super fuel-efficient diesel cars in worldwide automobile production will grow from 25 to 28 percent by 2016, and this despite the current slump in diesel sales. And the share of cars with gasoline direct injection technology, which reduces the consumption of gasoline engines, will triple in the same period to 16 percent. This alone represents an enormous opportunity for Bosch.

- Fourthly, we shall witness **the electrification of the powertrain car**. It won't come tomorrow, and it won't come all at once. The reason is that even years from today, a lithium-ion battery which enables a car to travel a minimum distance of 200 kilometers will still cost between 8 and 12 thousand euros, or as much as a small car. So both on the technical and the economic fronts, we have our work cut out for us. But over the long term, the electric drive is a must, since we have no choice but to mitigate climate change and to find an alternative to oil, the supplies of which are ever scarcer. By 2020, we expect to see three million electric cars and plug-in hybrids on the world's roads. This development will also give rise to new business models in the area of mobility, above all for the financing, provision, and charging of the battery. We see such models as part and parcel of a new technology, and as things which are therefore very much part of our future agenda.
- Finally, and despite all the fundamental changes in automotive drive technology, **driving safety** remains a priority for us. In Europe, following the example of the U.S., the ESP® electronic stability program introduced by Bosch is

to become standard equipment in cars. This closes a gap in passenger protection which would have become even larger with the growth we expect for the small car market. In this segment, a full 80 percent of all newly registered cars in Europe are still not equipped with ESP®, a brake control system that prevents up to 80 percent of all skidding accidents. Worldwide, every third newly registered vehicle is currently being equipped with ESP®. By 2012, this will be every second vehicle. This is important, since ESP® serves as a basis for further safety functions – above all in combination with driver assistance, but also with navigation. Today more than ever, automotive systems are being networked. This networking is something that can be achieved by automotive suppliers featuring a broad range of products and services – suppliers like Bosch.

The business: confidence in the face of a still serious situation

All this shows that the automotive industry is not only successfully containing the effects of the worst recession in decades, it is also gearing up for one of the most promising waves of innovation in a long time. This is of course a double challenge, particularly for a leading and technologically strong supplier like Bosch. But looking back, we must admit that the economic downturn has clearly left its marks on our results. We expect sales of the Bosch Group to fall this year by some 15 percent, in our automotive businesses possibly by as much as 20 percent. As a consequence, operating result will be clearly negative. At the end of 2009, we are set to have some 270,000 associates, a loss of 10,000 as compared with the beginning of the year. Over the same period, headcount in our automotive businesses will fall from 168,000 to approximately 160,000. But

these personnel adjustments are moderate compared to the overall decline in sales. These figures demonstrate the flexible approach we have taken to the downturn. Worldwide, some 100,000 Bosch Group associates currently have reduced working hours. And we shall stand by this policy, though we do expect the economic situation to improve in the course of this year. We have recently been seeing signs of such an improvement in our worldwide businesses.

These signs, which have been cumulating over the past few months, point to trends for a light recovery, albeit still at very low levels. For 2009, we expect year-on-year fourth-quarter sales to be up again – and not only because last year's fourth quarter saw sales dropping so sharply for the first time. Nonetheless, this relative improvement in year-on-year sales – which we call the baseline effect – should also support our growth in the coming year: we shall gradually find ourselves moving away from the disappointing results of the recent past. At the same time, we have to look at the figures. On the whole, it could take us until 2012 to regain the levels of 2007, the pre-recession levels. This means that for the years to come, we expect an underutilization of our capacities to continue.

While we are confident that we shall prevail, for the moment we are still in a difficult situation. How are we dealing with it? Well, above all, we want to keep our core team and their expertise on board, even if we cannot do this indefinitely. But we take a differentiated approach to this endeavor: while we adapt flexibly to a temporary downturn in economic activity, we react quickly and with all necessary rigor to structural change in the industry. We have to secure profits and liquidity. We have to

save money and at the same time secure our future. All our sectors have to master this balancing act, especially our research and development units. In 2009, we shall be spending some 3 billion euros on R&D in our automotive businesses alone. And we also set priorities when investing in our future. At the same time, we want to make use of our special competitive advantage, an advantage that issues from the reliability of our products and customer relations on the one hand and the sound financial basis of our operations on the other. Long-term orientation, entrepreneurial independence, financial stability: these are the principles that will continue to allow Bosch to distinguish itself. These are also the strengths that will count in the future innovation projects of our industry.

The innovations: every second euro for environmental protection

In concrete terms, though, what is Bosch doing for the future of the automobile? This can be shown by distinguishing four fields of innovation:

- Firstly, conserving resources and protecting the environment are top priorities. In automotive technology, every second euro we spend for research and development goes toward achieving these two aims. We are preparing road traffic for ever stricter worldwide emissions limits. At the same time, we are making it more efficient with the aim of protecting the climate. And here we are currently making significant progress. In drive technology, we offer an entire package of suitable measures, ranging from improved injection and start-stop systems to high-efficiency alternators. With these measures, we can reduce fuel consumption in gasoline and

diesel engines by another 25 to 30 percent. On top of this comes the fuel savings potential of the automakers themselves. This way, a middle-class diesel car will consume less than three liters of fuel for every 100 kilometers driven, and will thus emit less carbon dioxide than a comparable electric car feeding from a contemporary German energy mix. At this rate of fuel savings, the extra cost of the drive technology will pay for itself within three years. And diesel technology will not become more expensive for the lower vehicle segments, even with the emissions limits of the future. Driving diesel and saving money – this is an equation that will hold true for a long time to come, in most cases after driving only 10,000 kilometers a year.

- Secondly, we are pursuing the vision of accident-free driving step by step. At the beginning of 2010, we are teaming up with Audi to begin series production of our automatic emergency braking system, an innovation that can prevent three out of four rear-end collisions. As the first manufacturer to do so, we are linking ESP® here not only with radar, but also with video sensors, and this while maintaining full braking performance. The same package features further video-based functions: drivers are warned against departing from their lane unintentionally, and are also informed of speed limits in the instrument panel. All this means greater driving safety – system for system.
- Thirdly, linking existing systems together into a network creates new functions and new benefits. Take navigation as only one example: navigation data coupled with driver assistance systems can warn drivers of dangerous curves

ahead, and coupled with transmission control can reduce gear shifting operations on inclines. But navigation is not only a supplier of data for other systems. It can also process data from the engine management system. This can allow it to calculate an individual “eco-route” that takes into account not only vehicle and trip parameters, but also the driver’s behavior. According to our research, such a calculation can result in fuel savings of some seven percent.

- Last but not least, we continue to optimize and reinvent our own technologies, also to make them affordable for use in smaller cars. Today’s ESP®, for example, costs only a fourth of what it did in its first generation. In addition, we are currently in the process of introducing a long-range radar sensor with a silicon-germanium chip, the first of its kind in the world. The objective is to utilize such a sensor to make driver assistance systems affordable in lower vehicle classes. Doing this sometimes calls for high-tech solutions. Finally, for a market like India’s we are prepared to adopt an especially unconventional approach. There, we developed a common-rail system for low-price vehicles whose injection pump is derived from an application for construction machinery. This was a solution which Bosch engineers in emerging countries came up with.

The electric car: the initial milestones of a long journey

Examples like those I have mentioned show how well we are prepared for structural change in the automotive industry. Being prepared means that we not only extend our existing areas of innovation, we also carve out new ones along the way. The electric car of the future, too, will drive with Bosch technology.

A special business unit has been set up to advance electric drive technology, where some 500 engineers will be working by the end of 2009. Our hybrid technology is set to go into series production in 2010. And from 2011, we want to have our lithium-ion battery technology up and running on the roads. To this end, we have set up a joint venture, SB LiMotive, with Samsung SDI. Our partners there contribute their expertise in large-scale series production of cell technology for consumer electronics, and we couple this with our systems expertise in the automotive sector. Our investment budget for this project shows how serious we are about it: namely, some 500 million dollars by 2013. In the meantime, we have gained our first customer for this venture with BMW's "Megacity Vehicle" project, and last week we broke ground for a new plant in Korea which will make lithium-ion battery cells for cars. The first phase of construction is due to be completed by the end of 2012. Then, we shall be in a position to manufacture battery cells for a minimum of 125,000 hybrid and electric vehicles per year. So even if the electric car will take some time in coming, we have reached initial milestones along this road. This, then, is our contribution to achieving the ambitious goals of electromobility – in the U.S., Germany, China, or wherever.

The industry moving forward: challenge and opportunity for Bosch

The ability of the automotive industry to prevail and continuously move forward – and with this I come to my conclusion – thus remains unbroken, even in difficult times. And despite the most recent downturn in demand that we are currently experiencing in our industry, I have no doubt that worldwide, access to individual mobility is something that will

continue to be held in high regard, and will continue to grow. While the industrialized countries will retain their own demand in this sector, the emerging markets will continue to catch up. More cars in India and China – this need not mean that environmental and passenger protection will be compromised. Here, too, we are developing solutions according to the strategic premises of our corporate slogan “Invented for life.” Making our innovations affordable for the emerging markets – this is something, for example, we succeeded in achieving with our systems for the Tata Nano, just as it is something we regard as one of the essential challenges of structural change in our industry. For a globally active and innovative supplier like Bosch, this is not only an essential challenge, it is also an essential task. Achieving fuel savings is important even in difficult times. Doing so is something that calls upon all of us, automakers and suppliers alike, to continue to provide an abundance of innovative strength, and to come up with the budgets for it as well. Innovative strength is worth the investment, as it will enable Bosch to profit not only from the economic recovery that we see looming on the horizon, but also from technological change. We shall be the drivers of this change, just as we shall be its beneficiary.