

PPS Automotive – Focus document

This Focus document is the next step after the development of a vision for the Dutch automotive industry and the prelude for the strategic agenda. The document has been drafted with the future partners and stakeholders in PPS Automotive, and expresses a focused ambition:

"PPS Automotive - enabling integrated business and technological development on both Vehicle Efficiency and Driving Guidance, creating a leading position and significant sustainable economic growth"

1. The Dutch automotive industry intends to further strengthen its competitive position through technological innovations and expresses a strong ambition to increase its annual revenues from Eur 12 bn to Eur 20 bn in 2016;
2. PPS Automotive contributes to the ambition of the Dutch automotive industry through focused innovation on two areas of excellence and significant growth: Vehicle Efficiency and Driving Guidance;
3. Cooperation and commitment in the industry and between industry, knowledge institutes and government will be necessary. There are risks and bottlenecks, and there is a clear case for government support for the industry's ambitions.

The automotive industry is a global industry in which value is generated predominantly by suppliers to automakers. The Dutch automotive industry is no exception to this rule: over 95% of the companies that are active in the Dutch automotive industry are suppliers, with a clear focus on components or sub-systems. The share of OEMs (Original Equipment Manufacturers) of passenger cars, trucks and busses in the Dutch automotive industry is small. This situation is not a disadvantage, as in the international automotive industry today value is created predominantly by suppliers. Suppliers develop and assemble 65% of the average value of a vehicle; this share will increase to almost 80% over the next decade as suppliers assume more engineering and production responsibilities¹. It is not the OEM that creates most value in the automotive industry but the supplier.

Throughout the automotive industry, a digital revolution is taking place. Electronics will continue to supplant mechanics as the backbone of the car. The way to look at the car of the future is as an electronic structure with mechanical actuators to perform certain functions such as propulsion, with a bodyshell for comfort and a safety back-up in case the electronics fail. Almost 90% of the innovations in the automotive industry are related to electronics (powertrains, infotainment, telematics (mobility), and safety)². This digital revolution increases telematics and vehicle system control possibilities, but puts a large emphasis on the reliability and robustness (fault tolerance) of electronic and intelligent (embedded software) systems. Electronics and, subsequently, software, are prime challenges for the automotive industry.

¹ 'The Coming Age of Collaboration in the Automotive Industry', Mercer Management Journal 17, Munich, 2005

² 'How to master the electronics challenge', Study Roland Berger Strategy Consultants, Munich, 2005

1. The Dutch automotive industry intends to further strengthen its competitive position through technological innovations and expresses a strong ambition to increase its annual revenues from Eur 12 bn to Eur 20 bn in 2016

Technological innovation is at the heart of the future competitive position of the automotive industry. In the areas related to Vehicle Efficiency and Driving Guidance the Dutch automotive industry has the position, ability and ambition to become leading in the European or even world market. In these areas, the Dutch automotive sector is highly innovative and possesses a considerable knowledge base. The Dutch automotive industry intends to further strengthen its competitive position through technological innovations in these areas. In order to achieve this a strong additional innovation program in which industry, knowledge institutes and government collaborate, is necessary.

Ground breaking innovative steps can only be achieved by integrating disciplines (systems thinking) in a sound cooperation between companies and knowledge institutes. Because of their global scope and their natural ability to build effective partnerships, Dutch companies are likely to excel in this environment.

Based on these strengths, the Dutch automotive industry has quantified its ambition and expects to double the growth of the international automotive industry (2.6% p.a.³) and will increase its annual revenues with an ambitious 'delta' from Eur 12 bn to Eur 20 bn by 2016 (5.2% p.a.). Employment in the Dutch automotive industry is expected to grow with an increase from 38,000 FTE to 50,000 FTE⁴. Within this growth of employment, the share of FTE active in R&D and engineering – so called 'knowledge workers' (currently 2,500 FTE) – is likely to increase due to the focus on innovation.

PPS Automotive contributes to the ambition of the Dutch automotive industry through focused innovation on two areas of excellence and significant growth: Vehicle Efficiency and Driving Guidance. In Vehicle Efficiency experts⁵ expect that the Netherlands has the opportunity to become the second largest truck manufacturing country in Europe, with a market share of 20%. The resulting additional revenues directly related to the activities in PPS Automotive can be valued at **Eur 1.5 bn** by 2016. In Driving Guidance experts⁶ expect that the Netherlands has the opportunity to become one of the 3 leading countries in Driving Guidance world-wide. The resulting additional revenues directly related to PPS Automotive can be valued at **Eur 1.2 bn** by 2016.

Figure 1 gives an overview of the ambition of the Dutch automotive industry and the contribution of PPS Automotive.

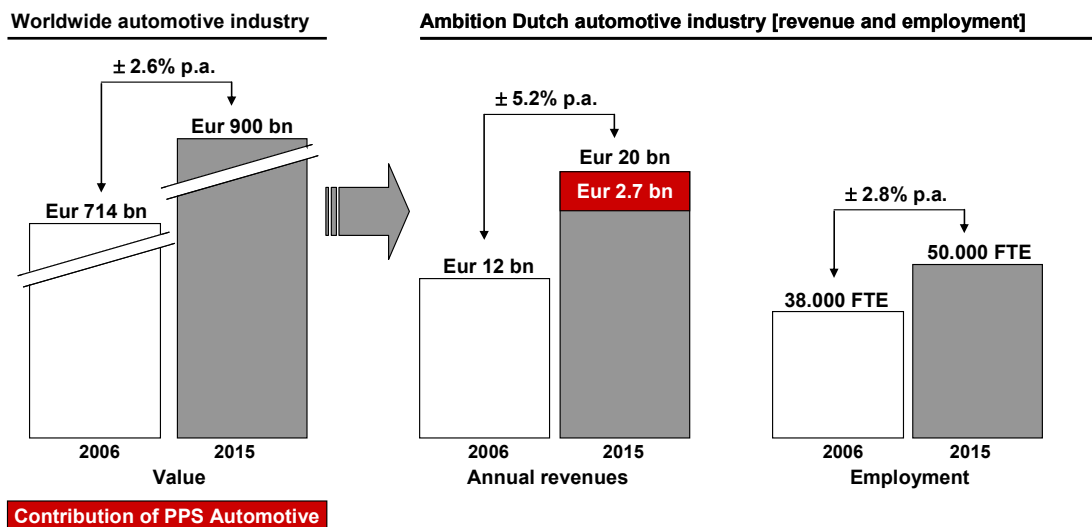
³ 'The Coming Age of Collaboration in the Automotive Industry', Mercer Management Journal 17, Munich, 2005

⁴ Overall employment is expected to grow less than proportional due to expected increase in productivity

⁵ Experts from participating companies in relevant focus meetings, among others: DAF Trucks, Siemens VDO and SKF

⁶ Experts from participating companies in relevant focus meetings, among others: Philips, Siemens VDO, VDL and SKF

Figure 1: Overview of ambition Dutch automotive industry and contribution of PPS Automotive



The total ambitions of the industry can only be achieved by an active cooperation within the industry whereby market position in existing, traditional sectors is maintained and market growth in the innovation-driven sectors are realised side by side. The PPS Automotive ambitions are built on a solid base of Eur 12 bn of which much is formed by the market for traditional automotive products and components which is also expected to grow in the future.

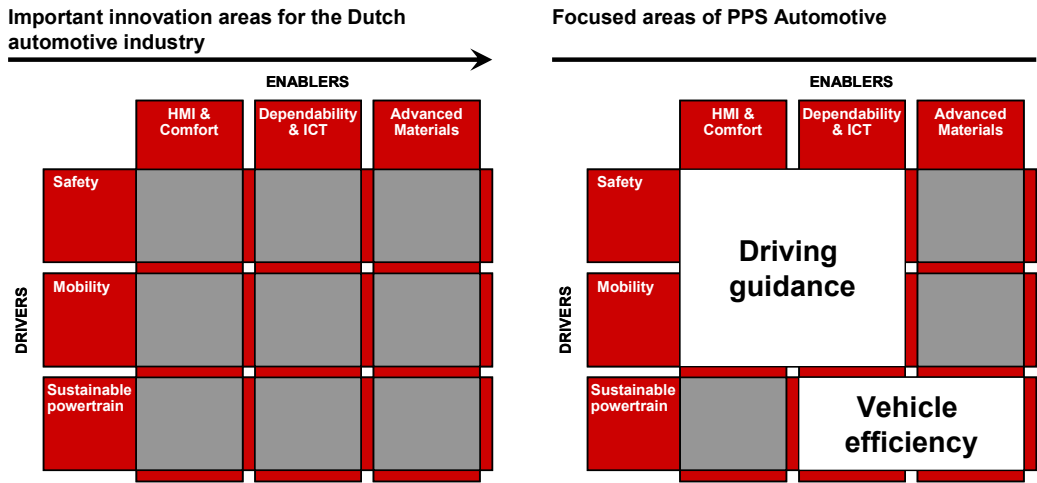
As a result of the automotive industry's close ties to other (manufacturing) sectors, the focused innovation of the Dutch automotive sector within PPS Automotive will contribute strongly to the development and diffusion of technologies in adjacent sectors of the Dutch economy (e.g., high-tech systems, engineering, consultancy). Moreover, as an important demand source for innovations from other industries, the Dutch automotive industry will increasingly stimulate innovations in other industries as well. Therefore, the contribution of PPS Automotive is expected to be higher than the described Eur 2.7 bn related to Vehicle Efficiency and Driving Guidance.

2. PPS Automotive contributes to the ambition of the Dutch automotive industry through innovation on two focus areas of excellence and significant growth: Vehicle Efficiency and Driving Guidance

PPS Automotive has chosen two focus areas of excellence and significant growth: Vehicle Efficiency and Driving Guidance. The areas are based on the important innovation areas for the Dutch automotive industry as defined in the first phase of PPS Automotive (*a vision for the Dutch automotive industry*). In extensive interviews and workshops with all key players in the Dutch automotive industry, the innovation areas were evaluated based on two criteria: (1) attractiveness of the market, (2) excellence and competitive strength of the Dutch automotive sector. The evaluation resulted in a focus on Vehicle Efficiency and Driving Guidance, both areas in which the Dutch automotive industry can achieve a leading international competitive position.

Figure 2 provides an overview of the focusing process.

Figure 2: Overview of results of interviews and workshops



For both focus areas, PPS Automotive formulated ambitious targets for a relatively short time horizon (2016) in order to realise concrete contributions:

- **Vehicle Efficiency:** reducing fuel consumption through more efficient vehicles. *Objective: achieve a 20% increase in fuel efficiency in 2016, resulting in an improved competitive position and additional revenues of Eur 1.5 bn.*
- **Driving Guidance:** enhancing mobility (significant reduction of congestion problems) through improved safety (reduction of traffic accidents) and use of advanced mobility information. *Objective: achieve a 25% reduction in travel time in 2016 based on current demands for mobility, resulting in an improved competitive position and leading to additional revenues of Eur 1.2 bn.*

Vehicle Efficiency

Increased fuel efficiency leads to competitive advantages. ...

The prime solution for the necessary reduction in CO₂ emissions is reducing energy consumption. Reducing energy consumption can be achieved with more efficient vehicles (*more driving kilometres per litre of fuel*). The ambition of the Dutch automotive industry is to increase fuel efficiency of the integrated powertrain (e.g. engine, transmission, auxiliaries) with 20% by 2016. This creates a competitive advantage for all parties involved, especially if they are able to take an integrated approach.

opens up new markets. ...

An increase in fuel efficiency will provide OEMs (initially truck- and later passenger car producers) with an improved competitive position and opens up new opportunities for

export. Cooperation with large European, North-American and Asian producers/OEMs will even further expand the research and supply base, as a leading position in powertrain efficiency is possible. Significant reduction of weight will open up the world market for the consortium as well and will result in significant market penetration of metal substitutes in a specific application (e.g. wheels, roof systems).

and will lead to additional revenues of 1.5 bn, ...

Experts⁷ estimate that a continued focus on fuel efficiency will lead to a further growth in market share of the Dutch automotive industry (initially in trucks). The current market share of the Dutch automotive industry in Europe (trucks) is 15%, this will increase to a market share of 20% (expert estimates), of which 3% can be directly related to the activities in PPS Automotive. Same increase will be achievable at regional partners in other parts of the value chain. With a market share of 20%, the Netherlands will become the second largest truck manufacturing country in Europe. The resulting additional revenues by 2016 can be valued at **Eur 1.5 bn**⁸.

through excellence by cooperation and integration.

In order to realise the above objectives an integrated approach is required, with expertise of several disciplines involved: engines, tribology, after treatment, advanced combustion, sensors and lightweight materials. The ELA region (Eindhoven, Leuven, Aken) embeds world-class knowledge on all disciplines involved: DAF Trucks (market leader in fuel efficiency in trucks), Siemens VDO (leading supplier of Energy Management Systems and E-horizon solutions), DSM (large supplier of light weight materials), SKF (worldwide no. 1 supplier of bearings), Sensata (worldwide leading supplier of sensors and controls) and DTI (named the most innovative powertrain company of 2006 by Frost & Sullivan). Moreover, TNO and TU/e have a medium European position in this field. Strong European expertise can be found just across the border in FEV Aachen (Germany) as well. PPS Automotive is in contact with the potential international partners, with a mutual intention to establish strategic partnerships.

Driving Guidance

Societal urgencies create opportunities for the Dutch Automotive industry, ...

The societal urgency for sustainable road transportation is evident. For example, road traffic in the Netherlands is expected to grow by 40% between 2000 and 2020. Delays as a result of congestion will increase rapidly. Moreover, Dutch policy directs that in 2020, deaths and hospital admissions have to decrease with 40% and 30% respectively (compared to level 2002). These are strong forces behind innovation. The ambition of the Dutch automotive industry is to achieve a 25% reduction in travel time in 2016 based on current demands for mobility and in compliance with the Dutch policy on safety. With this ambition, the Dutch automotive industry creates an environment for developing and testing new mobility technology and inspires the creation of a mobility platform that sets the standards and is capable of reducing travel time in a sustainable way. The ambition will set an European example that leads to a significant competitive advantage in 2016.

⁷ Experts from participating companies in relevant focus meetings, among others: DAF Trucks, Siemens VDO and SKF

⁸ Average value of a truck = 100.000 euro, estimated total market size Western Europe in 2016 = 500.000 trucks.

possessing a unique combination of strengths that can materialize these opportunities, ...
Innovations to meet these trends must come from mechatronics, embedded systems, and intelligent vehicle technology. The Dutch industrial landscape, possesses the unique combination of strengths in electronics, embedded software and automotive that can realize these needs. This enables the development of an open platform for car mobility that will strongly reduce development and failure costs. It will also allow new – large societal – systems requiring communication to be implemented (e.g. road pricing). Additionally the platform can cope with the ever increasing refreshment rates of consumer electronics, new markets prove to be significant. The integration of information systems can have a strong influence on safety improvements (related to how information systems distract the drivers attention from the traffic). In order to integrate all these functions in a safe way, advanced HMI (Human Machine Interaction) is required. In 2005 traffic accidents accounted for 13% of the traffic jams in the Netherlands⁹. Additionally, innovations in the field of active safety (Vehicle Dynamics Control) are relevant as well, as active safety is estimated to reduce traffic trauma in the future by 35-45%.

as does The Netherlands as an ideal test environment, ...
Experts indicate that the development of a platform for mobility will lead to strong opportunities for growth. The Netherlands can be considered as an ideal test-environment with highest societal urgency. A strong parallel is drawn with water technology and dredging, both areas where the Dutch industry has built a leading position based on the strong environmental challenges in the home market. The Government can take an important role in facilitating such a test environment.

which will lead to additional revenues of 1.2 bn, ...
Experts¹⁰ estimate that it is possible to get a market share of 15% of this new market (overall market size relevant for the Dutch automotive industry is Eur 8 bn in 2016¹¹). The Netherlands will thus become one of the 3 leading countries in Driving Guidance world-wide. This means a total of additional revenues in 2016 of **Eur 1.2 bn**.

through excellence by cooperation and integration.
Developing an open platform for car mobility with new mobility functions requires an integrated approach with enabling disciplines, such as: advanced navigation functions, HMI and active safety. The ELA region embeds world-class knowledge on these enabling disciplines: Siemens VDO (leading in navigation systems and HMI), Navteq (worldwide provider of digital map data), Philips (world leading in connectivity functions, HMI applications and sensors for active safety), DAF Trucks (leading in HMI for trucks), VDL (leading in HMI for busses), Sensata (worldwide leading supplier of sensors and controls), Vredestein (strong competences in load sensing for tyres) and SKF (leading worldwide supplier of load sensors). This industrial position is supported by several knowledge institutes: TNO (strong European competitive position in HMI), TU/e (strong European competitive position in Vehicle Dynamics Control) and TUD (medium European competitive position in mobility).

⁹ Filemonitor 2005, Ministerie van Verkeer en Waterstaat

¹⁰ Experts from participating companies in relevant focus meetings, among others: Philips, Siemens VDO, VDL and SKF

¹¹ Average added value per car = 100 euro, total market size world-wide in 2016 = 80 million cars

Dutch opportunities through integration with electronics and software

Innovations in the fields of Vehicle Efficiency and Driving Guidance are primarily enabled by increasing usage of electronics and software. These are new technologies which dramatically increase complexity. To cope with this, OEMs are shifting their efforts to standardized architectures across domains and vehicle platforms. Integration is the solution in the trend for reduction of complexity. As a consequence, new requirements for existing organisations arise (e.g. in the field of product development) as conventional methods for reliability engineering and testing do not apply: it is dependability that counts.

The Dutch automotive industry has an advantage in its geographical combination of automotive, electronic, and software knowledge. Strong expertise in this field can be found within the industry (e.g. Philips, Siemens VDO, SKF, Verum) as well as within knowledge institutes (ESI has a very strong European position in the field of dependability). Moreover, just across the border IMEC (Belgium) and Fraunhofer Institut (Germany) are leading institutes in the field of dependability, and have already expressed their interest in participating.

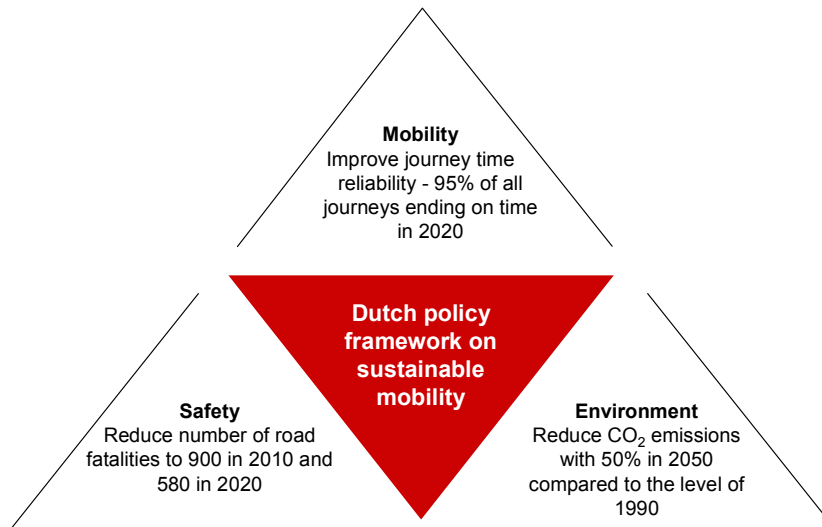
European and national social issues form important drivers for the business chain

Pursuing a leading role in Vehicle Efficiency and Driving Guidance enables the international automotive industry to meet the requirements and needs for more sustainable road transportation. The international automotive industry faces major challenges in order to meet the requirements and needs for more sustainable road transportation, particularly in the fields of environment, mobility and safety.

These objectives force the automotive industry to act, especially when taking into account the fact that solutions are currently not available and that the future demand for road transportation is expected to grow strongly. Therefore, meeting the objectives of sustainable road transportation (through the focus areas Vehicle Efficiency and Driving Guidance) will enable the Dutch automotive industry to further increase its future competitive position

Overview of objectives for more sustainable road transportation

- **Environment.** Reduction of greenhouse gas (GHG) emissions is a key societal concern due to the effect of global warming. The primary source of GHG emission from road transport is the gas Carbon Dioxide (CO₂), produced by the combustion of fossil fuels. Road transport accounts for an estimated 20% of total manmade CO₂ emissions. In the Netherlands the governmental objective is to achieve a reduction of 50% of CO₂ emissions in 2050 compared to the level of 1990¹².
- **Mobility.** Road traffic in the Netherlands is expected to grow by 40% between 2000 and 2020. Delays as a result of congestion will, in 2020, occur with increasing frequency during hours that are currently relatively quiet. The governmental objective is to improve journey time reliability: 95% of all journeys ending on time by 2020¹³.
- **Safety.** The Dutch objectives concerning safety are in line with the target set by the European Union's transport ministers of cutting traffic deaths by half in Europe by 2010. For 2010, the policy focuses on driving back the number of deaths and injured to 900 and 17,000. In 2020, deaths have to decrease to 580 and hospital admissions to 12,250: decreases of 40% and 30% respectively in comparison with 2002¹⁴.



¹² Transitie Actie Plan, Taskforce Energietransitie

¹³ Nota Mobiliteit deel III: Kabinetsstandpunt, 2005

¹⁴ Nota Mobiliteit deel III: Kabinetsstandpunt, 2005

3. Cooperation and commitment in the industry and between industry, knowledge institutes and government will be necessary. There are risks and bottlenecks, and there is a clear case for government support for the industry's ambitions

Cooperation

Interviews conducted with the most important companies active in the Dutch automotive industry demonstrate that currently cooperation within the sector is limited. All companies are cooperating to some extent, but this is mainly bilateral cooperation with knowledge institutes. The last decennia industrial parties have become increasingly convinced of the fact that innovation should take place in an open environment with a mixture of expertises, disciplines and backgrounds. It is a clear role of PPS Automotive and the Dutch government to stimulate this (international, cross-border) cooperation within the Dutch automotive sector and give a temporary impulse to innovation in the Dutch automotive industry.

Although the Dutch knowledge institutes harbour automotive expertise in many of the relevant fields, for certain areas of expertise cooperation with cross-border knowledge institutes is necessary. PPS Automotive is in contact with several potential international partners to explore and eventually establish strategic partnerships.

Role of SMEs

Innovation activities within PPS Automotive will be initiated around the main players in the Dutch automotive sector. Cooperation with smaller SMEs - creating multidisciplinary consortia that can address functions where conventional automotive technology is to be integrated with embedded systems and ICT - will be actively sought. Innovative SMEs (including spin-offs from universities and high schools) are essential in this formula, and business and working mechanisms will have to be developed to enable the SMEs to cooperate with the larger companies. The intention is to implement this in an open innovation setting.

Bottlenecks and role for the government

Apart from technological innovation, the consortium will work actively on relieving the main bottlenecks for innovation. Here also lies an important role for the Government:

- **Availability personnel:** number and quality of graduates is below the needs of the industry, there is a lack of technical specialists, and there is no automotive focus within the Dutch educational landscape;
- **Business development:** new marketing concepts and integration of old and new concepts are essential if the total business ambitions are to be realised, creation of consortia is necessary, in particular to get access to OEM's;
- **Knowledge dissemination:** need to improve knowledge transfer between industry and knowledge institutes, in particular with SMEs;
- **Access to capital for SMEs:** SMEs experience problems in getting access to (venture) capital and are faced with unclear decision making processes;
- **Stimulation of starting entrepreneurship:** starting entrepreneurs give a strong impulse to innovation;
- **Facilitation of pilot projects:** pilot projects are necessary to validate new applications.

Developing the ambitious positions through groundbreaking innovations as proposed in this Focus document is not without risk. Certainly not when realising that these positions need to be developed rather quickly since windows of opportunity are narrow in the competitive global automotive industry of today. This can be considered as another reason why the active participation of the Dutch government is absolutely necessary.

Commitment from industry is guaranteed

A significant number of industrial parties and knowledge institutes expressed commitment for the ambition of the Dutch automotive industry and the contribution of PPS Automotive to the ambition. The current status of commitment is **Eur 7.6 m per annum** for a 5 year period (Eur 4.9 m from industrial parties and Eur 2.7 m from knowledge institutes).