Submission for the Review of Australia's Automotive Industry 2008

Answers and proposals to the questions raised in the Discussion paper from 2008.

The Australian Automotive Industry

Page 4 questions:

Is the Australian automotive industry sustainable in the long term?

The Australian automotive industry must apply intelligent strategies that build on Australia's strengths and that are critical for future customer demands:

1. **Safety**: Experience in developing and manufacturing of safe cars like large rear wheel SUV's for traveling long distances in open space and hot climate
2. Natural gas and experience related the development of engines for the use of LPG and CNG
3. Raw material resources like metals
4. Concentration of a majority of the population in only a few big cities
5. Creativity and openness to strangers and new ideas

Vehicle safety is the mostly overlooked reason for the shift from large cars to small cars. 12 of the 72 Super Mini Cars tested by NCAP between 1997 and now did achieve the best rating of 5 stars for adult safety, which is about 16 % of all super minis. That compares quite well with the results of Large Off roads 4x4 where only 3 of 17 cars achieved the same 5 start rating (about 18%). Unfortunately none of the Australian produced large cars was able to achieve this prestigious 5 star rating. So for customers that put their family's safety first when looking for a new car, they are better off if they buy a super mini or a small car.

With the amount of natural resources available in Australia it only is a question of the price of transportation (mainly determined by the cost of energy and in particular oil) when it becomes more attractive to export finished goods as motor vehicles rather than exporting raw materials as iron ore, bauxite, coal or gas.

A recent study from Victorian Parliament's Economic Development and Infrastructure Committee confirmed "the enormous potential for fuels derived from natural gas – such as CNG, LNG and LPG – to significantly contribute to Australia's future fuel mix".

[1] ECONOMIC DEVELOPMENT AND INFRASTRUCTURE COMMITTEE, Media Release, Thursday 7 February 2008

How can Australian MVPs positively influence investment and export-destination decisions taken by their multinational parents (including

competition for investment and export markets amongst international units of the same multinational company)?

It will be crucial for Australian MVP to develop and produce vehicles that satisfy a vast array of trends and consumer demands in a global market and build on the strengths as identified before. Rather than producing 4 very similar products that are competing in the same market segment the MPV's would be better of if each of them would produce a vehicle for a different market segment. That would increase the potential sales volume of each manufacturer, not only within Australia, but also in export markets. Proposed vehicles lines are:

- Large SUV's… such as the Ford Territory in 2 & 4wd with dedicated LPG/CNG
- Large real wheel drive sedans… such as Falcon & Commodore/Statesman
- Small cars… such as Corolla, Focus & Fiesta
- Very small 2 seat city commuters (new)… such as the Ozkar. Details about the Ozkar vehicle project are given in a separate appendix at the end.

These vehicle lines must be strongly differentiated from existing competitors in the important areas of future customer demand:

- Safety features to reduce risk of usage in extreme conditions (off road) and cities
- Significantly reduced Greenhouse Gas Emissions like CO2 to address Global Warming
- Significantly reduced fuel consumption to reduce cost of usage. There are 4 main options to achieve that:
    - Utilise more efficient fuels like LPG and CNG
    - Improve power train efficiency
    - Reduce vehicle size
    - Change drive style by using (S4) smart stability suspension systems
- Reduced vehicle size is also beneficial to make best use of the decreasing parking space available in cities and to reduce traffic congestion
- Fun to drive, either through performance or vehicle dynamics
- "The car has become a metaphor of self-expression" [1], therefore additional features and designs are required to differentiate from competition. Fun sports like kite surfing, snowboarding, mountain biking, demonstrate how a new customer demand can be created with cross over products.

[2] Quo vadis, automotive industry? A vision of possible industry transformation, M. Seidel, C. Koch, S Chahil, European Management Journal Vol. 23, 2005

To get further clarification of customer trends a study would be required to clarify different usage splits between. One example is the rapid growth of bicycle sales in Australia: they are outselling cars for the 8th consecutive year now with a record of 1.47 million bicycles sold in 2007, and most of them were adult bikes.

[3] www.cyclingpromotion.com

A study in the European Automotive Industry by KPMG showed the biggest growth expected for:

- Low Cost vehicles
- Cross Overs and

- Hybrids

And the most important purchasing criteria are

- Fuel Economy
- Safety
- Affordability
- Quality

[4] 2007 KPMG Global Auto Executive Survey

How can Australian-based producers better take advantage of export opportunities?
Given its small production capacity, how can the Australian industry continue to occupy (or expand) its global "niche" markets?

The vehicles that are currently produced in Australia require large investments for development and production because:

- The need to meet various different safety and emissions regulations
- Different customer requirements of export markets like very low temperatures
- Right and left hand drive

Developing vehicles that need less investment costs compared to the actual product range of Australian MVP is a great opportunity. An example is a narrow cross over vehicle with 2 tandem seats such as the Ozkar. Such a vehicle does not require additional investments for left- and right hand side versions and there are much less US- and European Standards to be met so the development complexity and the investment costs are only a fraction compared to normal passenger cars. With such a narrow cross over vehicle Australian MVP's have the chance to create a new market segment and be the global leader related such a new vehicle platform.

How can component producers better integrate themselves into global supply chains of multinational companies and lessen their dependence on domestic producers?

Perhaps in the development of smart and intelligent electronics systems for communications, data transfer and safety suspension systems, such as the work being done by NCITA at Melbourne University (60 GHz chip), ITS (intelligent Transport Systems at Port Melbourne (co's such as Dejai Live & MetroMetrix) and the Auto CRC. All of these have projects that could create world leadership in parts and accessory supply chains.

Is there a role for eminent Australian business executives with links to the CEOs of major automotive companies to act as Ambassadors for the local industry and to help them gain access to the 'decision makers' in international companies?

If the Australia Executive is acknowledged as being a global leader in their field or sector of supply… yes.

How can the industry address the challenges of changing consumer preferences?

The industry needs to develop and build a complete new vehicle type that addresses most changing consumer preferences as mentioned before by being SAFE:

- **S**pace saving,
- **A**ffordable
- **F**un and
- **E**fficient.

The industry can do this together rather than alone similar as Ford and Holden did when they developed the first Ute that became an Australian icon.

Will the steady consumer drift towards smaller vehicles, evident over recent years, continue or even accelerate?

Smaller cars will become even more popular in the future. In the past small cars were considered as being less safe compared to large cars. Recent developments in car safety have changed that paradigm, safety is not a function of size but dependent on the engineering intelligence how to design smart crush zones and safety related features like airbags, etc. Vehicles with the most prestigious 5 star rating from NCAP are for example the following super mini cars: Mazda 2, BMW Mini, Fiat 500 and Grande Punto, Opel Corsa, Peugeot 1007, 207 and 207CC, Renault Clio and Modus, and Toyota Yaris.

[5] http://www.euroncap.com/supermini.aspx

The VDI nachrichten, the weekly newspaper of the Society of German Engineers, reported in March that this trend will increase as 51 new super mini- and mini cars will be launched until 2011. These new models are not only new versions of existing model, but 19 complete new models will be launched, for example the Alfa Romeo Junior, Audi A1 inclusive cabriolet, Mercedes Mini A-class, BMW city and Mini SUV, VW Up and Mini Beetle. Professor Ferdinand Dudenhoefer, Director of the Centre Automotive Research, University of Applied Science Gelsenkirchen in Germany and General Manager of B&D-Forecast comments that these new super small cars are required to achieve the ambitious EU-CO2 targets of 130g/km in 2012. He also recommends cooperation-strategies and –projects as demonstrated successfully in the past by the PSA group (Peugot/Citroen).

[6] VDI nachrichten, March 7, 2008

Other reasons for that trend are again:

- Increasing fuel prices and resulting operating costs

- Awareness of the bigger environmental impact of large cars
- Less parking space available in cities
- Increasing urbanization
- Aging of society

An interesting demographic trend is that most developed nations become older and older every year. There are two reasons for that: firstly the life expectancy is growing, e.g. in Australia it increased from 55.2 years in 1903 to 75.0 in 1993 for men and this is a 36% increase in 90 years as sown in figure 1. Secondly the birth rates are lower than the average of 2.2 that are required to maintain the same population the fertility is continuously decreasing since the 1960's. This means there is a continuous demand to support the needs of older people. But older people don't need large cars that are able to carry many people around and also larger car are generally more difficult to manoeuvre into smaller parking lots.

The average car occupancy for journeys to work is only somewhat higher than 1, actually only about **1.2** according to Public Transport User Organisation (PTUO)

[7] Common Urban Myths About Transport, Public Transport User Organisation, 2006

In the US this number is the same even considering all times usage.

[8] Robert Riley, SAE, Alternative Cars for the 21st century

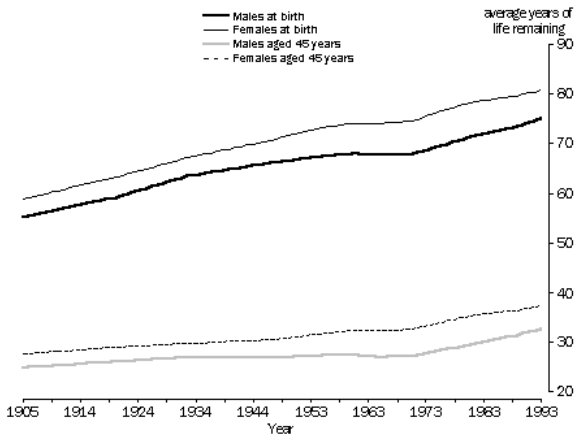

Figure 1: Life time expectancy at selected ages

[9] Australian Bureau of Statistics, Australian Social Trends, 1995

Increased traffic congestion is a direct consequence of the growing vehicle fleet and the increased distance travelled per vehicle: "In 2003 - 2004 alone, the passenger vehicle fleet on Australia's roads increased by three percent or around 260,000 extra vehicles nationally.

[10] AAMI, NATIONAL MEDIA RELEASE, September 2005

"The OECD has prepared projections which indicate that, between 1990 and 2030, there will be an increase of 79 per cent in kilometres travelled by all vehicles within the OECD countries, and even a rise of 312 per cent for countries outside the OECD (OECD 1996)".

[11] Ainsley Jolley, New Technologies, Industry Developments and Emission Trends in Key Sectors: The Land Transportation Sector Draft Working Paper No. 1, Climate Change Project Climate Change, Industrial Structure and the Knowledge Economy Working Paper Series, September 2004

What would be the impact of this trend on the local industry?

The local industry has to change dramatically to survive. 3 competitive large car lines are not sustainable with this trend. The industry has to work together closely and decide who should compete in which market segment in the global market, as mentioned before in the segments of large SUV's, large real wheel drive sedans, small cars and very small city commuters. That can be achieved if the industry works closely together. This was demonstrated successfully with the first Ute's. In Europe these joint ventures are also very successful for niche products with smaller volumes, positive examples were the common development and production of:

- Ford Galaxy and VW Sharan people mover
- Mercedes Sprinter and VW Transporter
- Renault and Opel (GM) van
- Diesel engine joint venture between Ford and PSA
- Engine joint venture between PSA and BMW

If the industry acts quickly enough by developing the right product it will have a great future and can build on the niche export markets that rear wheel large vehicles have in markets like the Middle East.

What is the export potential of vehicles other than those currently produced?

The export potential for small, fuel efficient, safe and fun vehicles is huge, not only in all mature markets as Japan, Europe and the US, but in particular in the growing markets of India and China. Vehicle concepts like Ozkar are perfect for the crowded peak hour fleet commuters in CBD's.

How can the tooling industry lessen its reliance on the automotive sector, especially given the lumpiness of investment by the MVPs in 'tooling up' for new vehicle models?

No comment.

The Global Automotive Industry

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How can the Australian industry compete for investment and capacity given the changes in the international environment, particularly the trend to locate production to low factor cost countries?

Developing and producing high tech products that are leaders in there market segment through superior technology (for leading safety, performance and efficiency), design, craftsmanship, refinement and quality at affordable costs is the key for future success. Manufacturers like Porsche, BMW, Harley-Davidson, Toyota, and Renault are examples that this strategy is working. The trend to produce in countries with low labor costs will stop when other cost factors will dominate, such as the cost of energy to produce and transport the products.

How will the growth in global production by the developing economies affect Australian exports?

That will only increase the pressure on the Australian MVP to produce more sophisticated and products that address current trends.

What are the implications for providing investment assistance to the local Australia industry given the incentives offered by other economies?

Investment incentives need to clearly focus on the global trends as mentioned before. Other economies like Europe have already supported the development of small, efficient and fun tilting narrow vehicle like the CLEVER (**C**ompact **L**ow-**E**mission **Ve**hicle for U**r**ban Transport)

[12] http://www.clever-project.net/

What are the industry policy implications given the fact that many of these International developments reflect competitive pressures between units of the one multinational enterprise?

We are global small players for 3 multi-national OEMs, as long as we are profitable in our niche market usage and build on our strengths we will survive by being globally competitive and keep shareholder returns at a premium.

Is there potential for increased foreign direct investment into Australia, particularly from automotive companies located in emerging markets?

Clearly yes, for break through innovations that is improving fuel economy, CO2 emissions, safety and driving fun.

A good example would be an intelligent high tech control system to stabilize narrow vehicles like motorbikes, scooters and push bikes, as currently being developed by Ino8 Pty Ltd, see appendix.

Current Automotive Policy Arrangements

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Should automotive-specific assistance continue? If so, are ACIS and tariffs appropriate mechanisms?

Incentives need to be provided much more strategically as it is much more attractive in the long run to invest in new break through technologies. The assistance should be provided based on criteria that are also used in the clean tech sector of the venture capital industry with funds set up for longer periods than the usual 10 years. The crux is that the pay back time for new technologies in the automotive industry is very long to break even. So investments need to be evaluated according to long term benefits with times spans of more than 10 years. If there were incentives to have internal ventures that would help to foster innovation. Such incentives for "internal ventures" should be focused on areas that are utilizing Australia's natural resources and strengths, for example to develop a variable compression ratio technology so that bi-fuel engines that can run on petrol and on LPG or CNG can be operated at the maximum efficiency with all fuel types. Currently most compression ratios are optimized for only one fuel, for example petrol, but on LPG or CNG have a much higher octane number enabling higher compression ratios and resulting higher thermal efficiency.

Is it appropriate to reduce the passenger motor vehicle and parts thereof tariff to 5 percent in 2010 or is it appropriate for it remain at 10 percent? Who would benefit and lose from a reduction or a freeze? No Comment

Is it appropriate to maintain ACIS support for the industry if the passenger motor vehicle tariff remains at 10 percent post-2010? No Comment

If ACIS is maintained, is the current level of funding appropriate? No Comment

Is the payment of duty credits the appropriate mechanism for providing industry support under ACIS, particularly given the possible erosion of tariff revenue under FTAs? No Comment

Is the ACIS funding allocation between the category types (ie, capped and uncappedproduction credits) appropriate? No Comment

Is the LCT threshold level appropriate? No Comment

Should the LCT be lowered for more fuel efficient vehicles?

The LCT should be replaced by a CO2 tax to foster the introduction of new fuel saving technologies. The CO2 based taxation worked very well in Europe and helped to make the European automotive industry very competitive. Results of the European

CO2 tax system are the development of leading edge technologies related to power train efficiency, aerodynamic and tyre rolling resistance. Examples are common rail diesel injection, piezo injectors, second generation stratified direct injection for petrol, BMW's efficient dynamics strategy supported with variable valve trains and start stop technologies, thermal management solutions and green tyres.

Do state and territory taxes affect the costs of production and the demand for new vehicles? No Comment

Should ACIS be targeted to companies which undertake activities with the potential for sustainable returns or continue to be a broad-based program?

ACIS should be targeted based on principles as used in the Venture Capital (VC) Industry, with the exception that investments need to be supported that have a much longer pay back time than the maximum 5 years to support the typical 10 years lifetime of VC funds.

Applications for support should project based and to be assessed and approved by an independent international panel. The panel should include at least one representative of a VC company from Asia, the United States and Europe. Each representative needs to have experience in managing a fund with a life time of at least 15 years. There are various advantages of having VC representatives approving the ASIC support:

- The application of the same principles of the VC industry ensures that the success rate should be similar as for investments in the VC industry
- Through the assessment of the international VC representatives a first contact is made between the Australian company and the international VC's. This means that a parallel role of the assessments is to be a showcasing platform for Australian innovations to the international VC industry that is institutionalized.
- Running through these assessments will act as a training for the Australian Automotive industry to make companies fit and ready for international investors by providing valuable feedback.

Should government investment incentives be better focused and coordinated across and between tiers of government? If so, how?

It is very difficult for start up companies with great new ideas for sustainable products to get funding to prove the ideas in functional prototypes. The COMET program for is a great help put it only supports small projects of a size below $200k.. In the Automotive sector the support through the COMET program accounts only 0,04 % of the total R&D assistance provided by the Federal Government. For many automotive technologies the costs of Research, Development and Verification is much bigger, in the range of several millions and for new Production the investments are even in the range of a billion dollars. On the other hand it takes a long time to develop these new automotive technologies and therefore it takes between 5 and 10 years until they make it into production. Therefore it is very difficult for a small start up company to find the necessary investments only to prove a concept. Although there are many Government programs are available to support the development of new technologies,

most of these programs contribute a maximum of 50 cents per dollar, they only support companies with a solid track record and in most cases support from State Governments can't be combined with support from the Federal Government.

A solid reliable road map of funding for innovative automotive technologies is required. That could start with support through the existing COMET program - which needs to be extended significantly to increase the speed of innovation - just to secure patent protection and market validation but in a shorter time frame. That could be followed by support by the Commercial Ready program that needs to be extended to start up companies and it needs to be possible that these support programs can be supplemented by State Government programs like STI/SERD/ETIS/VISTECH, etc., but working with the COMET Business Advisers who have the commercial empathies.

To better support start up companies Assistance should be available above the typical maximum of 50% of project costs. That could transform Australia into a "Silicon Valley" related to green and safe automotive technologies. The support that exceeds the 50% could be granted as a loan that needs to be payed back, similar as for the VISTEC - program from the Vistorian State Government that encourages collaborations between Victorian and Israeli companies.

[13] http://www.business.vic.gov.au/BUSVIC/STANDARD//pc=pc=PC_61019.html

Does ACIS induce additional expenditure on R&D and plant and equipment?

Only if it is an enhancement to local supply chain with the potential for export not just local MVPs.

Do the benefits outweigh the costs?

If a ceiling of minimum export sales of say 20% within 3 years of commercial local delivery…Yes

Are there features of the automotive industry that warrant it receiving additional support for its R&D over other sectors?

There are some several reasons why the automotive industry deserves receiving additional support for its R&D because:

- It takes very long to receive a return on investment because of the long development process and the huge investments involved
- The automotive industry is a key sector related to the global warming
- The car industry was a key enabler of modern society by providing individual transportation over long distances.

What, if any, assistance mechanism might have better accounted for changes in the industry since 2002?

Incentives for the development and production implementation of safety- and fuel efficiency related technologies focused on innovations provided by small start up companies in collaboration with Universities are a very successful alternative. In particular this works very well in Europe where many successful Engineering Partners started as University spin offs where the company CEO and owner often is an active University Professor, examples are AVL, FEV or IAV.

Another important requirement is independent market research to clearly identify critical changes in customer usage, in particular in cities. This is not only important to know for the automotive industry but also for the urban planers.

Does the modulation rate for ACIS affect the overall levels of investment in plant and equipment and R&D?

No knowledge

Should Australia enter into further free trade agreements to improve market access?
If so, what countries should be priorities for free trade agreements?

Additional free trade agreements are very helpful, in particular with countries to where we are already exporting like the middle east and even more importantly countries with a big growth potential like India and China.

What is the impact on the components sector of parts entering duty free under free trade agreements?

No knowledge

Innovation

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Are the current levels of innovation by the industry appropriate, particularly to meet future challenges?

Not at all, the industry needs to be directed in the right way, especially related to trends with long lead time like global warming or trends related to managing the safety of other people (like accident prevention technologies etc.).

If innovation in the industry is high, what scope exists to raise this higher?

Taking a harder look at import replacement in key high technology products that can build global competitiveness in our local supply chain innovators.

Are automotive-related programs, such as ACIS, appropriate and effective in funding and promoting innovation in the automotive industry, and are the types of innovation encouraged by these programs also appropriate?

The ACIS program has not really encouraged innovations , it only helped to adopt technologies that have been around quite a while as state of the art in other economies.

How can the Green Car Innovation Fund best assist the automotive industry address the development and manufacture of low emission technologies?

The automotive requires incentives that foster a culture of calculated risk taking similar as in small start up organizations. The fund needs to be structured so that it can be combined with other Government Programs as COMET, Commercial Ready, or Programs from State Governments.

Because of the relatively small Australian market it would be great if a collaborative vehicle project could be initiated. An ideal platform to showcase this new vehicle to the world is the Automotive X-Prize competition in the US for vehicles with a fuel economy better than 100 miles per gallon.

[14] http://www.progressive.com/autoxprize

A new type of vehicle could be developed in a similar way as with the aXcess Australia projects a while ago, but different in a way that the vehicle needs to define a new market segment. The Ozkar project could be perfect as an inner city commuter vehicle, preferably in some form of joint venture with other smaller countries with high tech capacity and close to Europe such as Israel.

Are there any "new frontier" technologies that the Green Car Innovation Fund could assist the development of?

The start of the Green Car Innovation Fund in 2011 is too late for our industry to catch up in many important areas like fuel efficiency and safety. To become successful this fund needs to be made available ASAP, realistically this could be a start in 2009. Examples of cost attractive new frontier technologies that need to be supported are:

- Tilting control systems as for the CLEVER and Carver vehicles similar like the SafeRide™ technology that is already supported by the COMET program
- Affordable Cylinder De-Activation technologies
- Variable Compression ratio systems
- Thermo-management systems for fast warm up
- Exhaust heat recovery systems
- Intelligent controls and parameter optimization, in particular related to the calibration of engines and transmissions
- High Swirl Combustion chambers for reduced heat transfer
- Intelligent materials like rheological fluids and piezo-technology
- New "Hybrid" fuels and relevant storage
- HCCI - Homogeneous Charge Compression Ignition
- Alternative "variable" crank shaft mechanisms
- Advanced Injection Systems
- Rotary valve trains

Unfortunately internal combustion engines and powertrains are not very well represented in the curriculums of Australia's Universities and also not in their research priorities. For example a course for engine or powertrain technologies does not exist at Deakin University in Geelong although Geelong is one of less than a hand full of cities in Australia with a manufacturing plant for combustion engines. More professorships for advanced engine- and powertrain technologies would lead to more innovations in that field that is very important for the automotive industry and essential to reduce transport related greenhouse gas emissions. It appears that most research findings in that field is rather published overseas than during conferences in Australia. One of the few exceptions is Prof. Harry Watson. Together with SAE-A he is organizing several powertrain related seminars and workshop every year.

[15] http://www.sae-a.com.au/

Is the Australian market and the automotive industry of a scale to be able to fund thedevelopment or uptake of new technologies? Can ACIS or other Government programs facilitate this?

The Australian market alone is too small to fund the development of new technologies because of the risk involved. However, targeted Government support can reduce that risk. Although programs like ACIS are a nice gift, it does not really foster a risk taking culture as most programs have to be matched.

An alternative would be a program that is designed as a loan for the relevant R&D with incentives for successful commercialization, for example that only 50% of the loan needs to be paid back if the project is successful. For successful projects the Governments will get paid back through taxes anyway.

Particularly attractive are technologies that can be exported as finished products or even better as IP in form of license fees. Companies like Bishop and Orbital are successful examples of how a small start company can turn into a manufacturer of safety- and efficiency related technologies. Plus, spin off companies from University, CRC and other public sector research organizations should be audited by commercial suppliers and procurement specialist from the local OEMs, who are very experienced in Life Cycle costing and global competitiveness in automotive supply chain technologies.

To what extent are "spillover" benefits from automotive-related innovation and manufacturing benefiting other manufacturing sectors?

Spill over effects have a big potential, in particular related to new intelligent materials, intelligent control systems and "hybrid" fuels and their storage. Storage of solar energy and control of solar systems are a potential example.

Is there an identifiable "category changing" initiative such as attracting the building of an existing smaller or alternative technology vehicle to an established manufacturer's plant?

The COMET program already supports the development of the SafeRide™ technology that will control the vehicle dynamics and in particular the tilting of narrow vehicles. This technology is an enabler of a whole range of new vehicles of a complete new market segment. Strong interest is already available from manufacturers of motorcycles and All Terrain Vehicles.

Further research needs to be conducted to identify the market segment with the biggest potential for example if such a vehicle should have the performance and structure of a car or a scooter or even a push bike.

Is there scope for the automotive sector to benefit through greater collaboration within the sector or with other entities in Australia's innovation system?

Greater collaboration between different MVP's and suppliers as well as with Universities is essential for the future success of the Australian Automotive Industry because the market is too small if the MVP's compete against each other. This is another area where Australia could successfully adopt a structure that helped the German car industry to stay ahead of its competition in various areas.

To conduct joint research related to internal combustion engines an organization called FVV (Research Association for Combustion Engines) was established in Germany already in 1956. This organization conducts about 40 research projects in parallel similar as many CRC's but with the advantage that all MVP's, most suppliers and also many SME's are members and that it is not only set up for a limited period as the CRC's are.

[16] http://www.fvv-net.eu/the-forum-for-joint-research/view?set_language=en

Germany was very successful in establishing a leadership related to the creation, management and distribution of information and knowledge related to automotive technologies. Only in the powertrain sector alone there are around 100 international conferences and seminars per year compared to only about a hand full in Australia.

These conferences are being organized by very different organizations like not only the FVV, but also publishing organizations like Vieweg (MTZ/ATZ magazines – compare to Go-auto), professional training organizations (Haus der Technik, CTi), VDI (compare to SAE-A), Technical Services like TUV, and Engineering Partners (AVL, FEV and IAV).

These conferences are very often combines with attractive cultural events that are also interesting for the spouses of the conference attendees. With the tourism industry and University education being 2 of Australia's 4 biggest export industry sectors, Australia is very well positioned to establish a similar leading role in the emerging Asian Pacific region. However, that need's to happen quick and needs to be well coordinated.

It also probably needs some incentives related to a global marketing effort and to convince organizations that could play a leading roll in that like SAE-A, Universities, State Auto Clubs like RACV, RACQ, CRC's, DoTaRS, etc.

Is there a niche in the component sector in which appropriately targeted assistance for investment in research and development might enhance a global position?

The development of control systems for tilting vehicles and various fuel saving technologies are a niche where Australia could establish a leading global position. If these technologies can be developed properly and would be combined in one new vehicle, such as the Ozkar project, that would significantly strengthen Australia's position in the global market.

Is there a means of identifying prospective areas of technology in which Australia may have or be able to carve out and defend a niche, eg in weight reduction technologies, lightweight materials, and techniques?

Applying technologies used by business angles that support start-up companies as business advisors through the COMET program seems to work well and should be

applied. However, it appears that not enough of these COMET business advisors are available as they seem to have a very high workload due to the numbers of projects each advisor is supporting, but very strong industry connections, even on a global basis.

Therefore more of these positions should be established to foster innovation. Positive examples where Australian companies have carved out a niche related to powertrain efficiency and safety are Orbital with its air assisted fuel injection, Bishop with its steering system and Kinetic with suspension system.

Does Australia have prospective advantages in the design, engineering or manufacture of segments of (developments in) powertrain technologies?

Because of the intellectual intelligence available in various Universities, MVP's and suppliers there is a potential advantage in the development and production of certain powertrain technologies and safety related technologies.

In particular the area of alternative fuels like LPG is very strongly represented in Australia. The availability of Natural Gas has an even bigger potential, it is important to know that CNG has significant advantages related to greenhouse gas emission not only compared to Petrol but also compared to Diesel ! In Europe Natural Gas Vehicles are poised for takeoff as the European Commission transport policy is focused on replacing 20% of the petroleum products in the transport sector by 2020 and natural gas accounting for at least half of that.

[17] Jeffrey Seisler: Natural Gas Vehicles on the European Agenda, in: Gas vehicles, the adequate answer to the CO2 challenge of the future ?, 2004

For the Australian economy probably more important than the greenhouse gas emission advantages of natural gas is its positive impact on the balance of trade: If all Australian motor vehicles were powered by natural gas (that does not need to be imported) this **would reduce the spending on oil imports by over $8.8 billon per year**. The assumptions for this calculation are the following:

Annual distance travelled by all motor vehicles: 209,405 million kilometers
Average rate of fuel consumption: 13.8l/100km

[18] REVIEW OF AUSTRALIA'S AUTOMOTIVE INDUSTRY 2008, BACKGROUND PAPER (assuming there was a typo on page 31 where the number 100 is missing as 13.8l/km is very high)

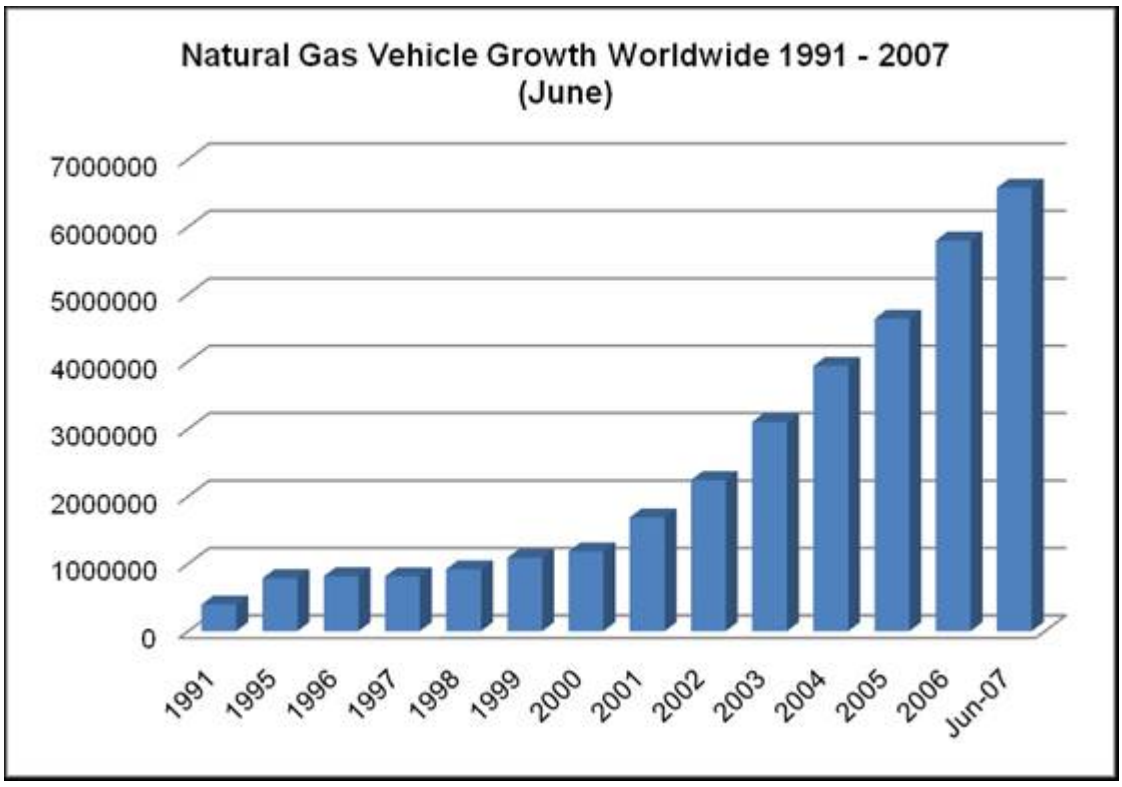
Oil Price: $120 per barrel

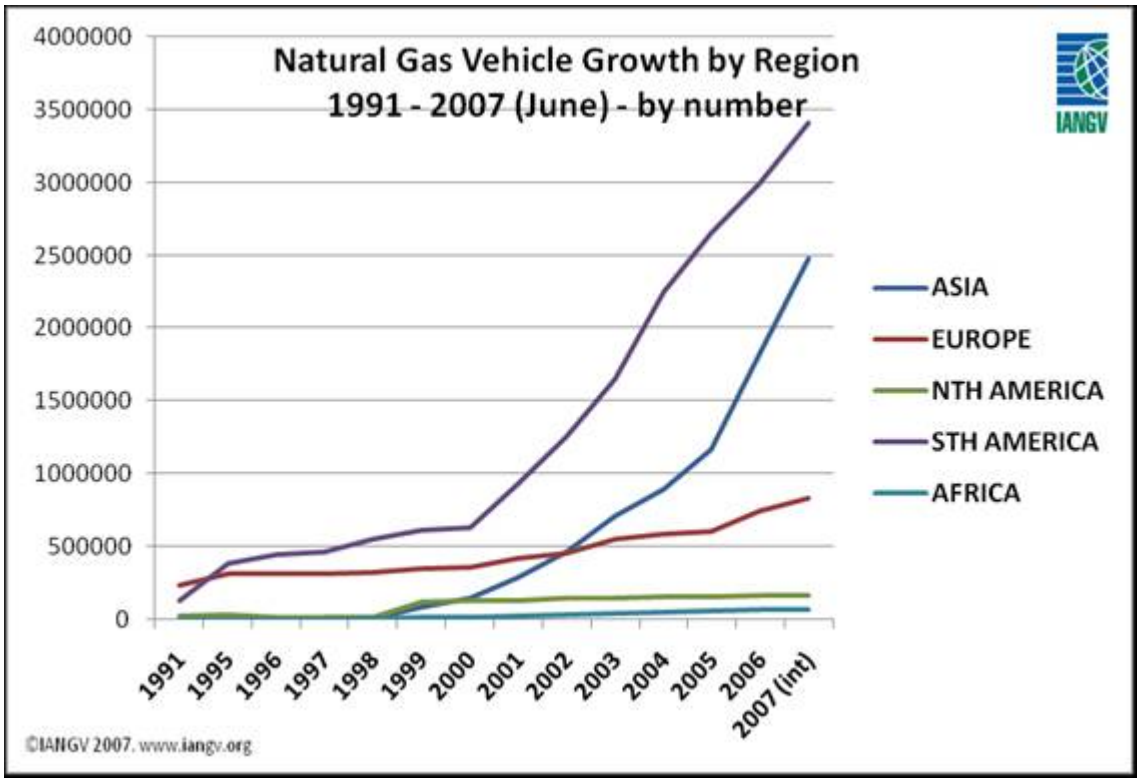
[19] Associated Press: http://ap.google.com/article/ALeqM5i5TtajgUpSm7KY5jf-lCJGHBB-tAD90FOE8O4

"In the financial year 2004-2005 Australia **imported nearly 30% of the oil it consumed** and this proportion will increase in future."

[20] ASPO-Australia, Australian Association for the Study of Peak Oil & Gas, www.ASPO-Australia.org.au, Deputy Convenor, Dr Sheridan M

With a world wide **annual growth rate of 30.6%** since 2000 CNG vehicles showed a huge growth potential. In the **Asian** region this growth rate was even **50%**.





[20] International Association for Natural Gas Vehicles: http://www.iangv.org/ngv-statistics.html

The CNG version of the Ford Focus in Europe for example produces a similar level of CO2 emissions as the Diesel version – about 12% less than the Petrol version - but with significantly lower particulates and NOx emissions than the Diesel.

[21] http://www.ford.de/ie/verbrauchswerte/-/-/-/-/-/-#90

This CNG Focus is a dual fuel version which is designed to run on Petrol and on CNG so it is not even optimized to make the best use of CNG. Opel in Germany (GM /Holden's German brand) offers a monovalent CNG version of their Zafira which is optimized for CNG. They claim "it produces 80 percent less nitrogen oxide than a diesel, and around 20 percent less CO2 than a gasoline model (15 percent less CO2 than diesel). What is more, the exhaust gases contain almost no soot particles… A 14-liter gasoline reserve tank ensures continued mobility on routes without a natural gas filling station".

[22] http://media.gm.com/intl/opel/en/product_services/r_commveh/r_m_cng/index.html

Mercedes-Benz are claiming similar CO2 improvements of over 20% with their dual fuel CNG vehicle E200 NGT compared to its petrol version which makes use of a super charger which makes it the most power full CNG production vehicle.

[23] Juergen Henke, Roland Kemmer: Drive concept of the bivalent natural gas car Mercedes Benz E200 NGT, in: Gas vehicles, the adequate answer to the CO2 challenge of the future ?, 2004

The maximum potential for a CNG powered vehicle is presented by Professor Michael Bargende from FKSF Stuttgart for a turbo-charged downsized engine a 42% CO2 reduction was calculated compared to the baseline petrol version. In combination with hybrid technology an additional reduction of 17% could be achieved - or 52% improvement to the base petrol version.

[24] Hans-Juergen Berner, Michael Bargende: A CO2 minimised propulsion concept using natural gas as a fuel, in: Gas vehicles, the adequate answer to the CO2 challenge of the future ?, 2004

Another advantage of CNG compared to Diesel fuel is that it also delivers the same benefits even if combined with Hybrid technology. For example IFP (Institut Français du Pétrole) presented a CNG-electric hybrid prototype vehicle based on the Toyota Prius at this Challenge Bibendum, running in Paris from 8-12 June 2006. "This retrofitted Toyota Prius emits 20% less CO2 (80 g/km)".

[25] http://greencar.us/2006/06/10/retro-fitted-toyota-prius-runs-on-cng/

In the past, automotive developments have flowed from the aftermarket sector (eg, GPS automotive systems). As such, what is the potential for further innovations in this sector to make there way into mainstream vehicle assembly? If so, how are these identified and fostered?

There are various aspects that are important in that context: firstly a formalized network is required to indentify these innovations. That network should include contacts of many parties that might be interested, starting with the MVP's (e.g. through

the FCAI), FAPM, AAAA, ALPG, etc., but even more importantly contacts of similar international organizations from overseas are needed.

Secondly a platform is required for these technologies to be showcase either in form of presenting the results in conferences as mentioned before, but most importantly is the funding required to build functional prototypes so that results can be presented to interested parties.

Environment

Page 19 questions

What are the appropriate fuel quality standards required for the adoption of the latest vehicle emission abatement technologies?

In Europe fuel quality standards (with low sulphur levels) enabled the breakthrough of innovative powertrain technologies like downsized direct injected turbo charged petrol engines and particulate filters and Nox traps. That success can be repeated much easier in Australia with its clearly defined boundaries. In Europe that was much more complex not only because of the various countries involved that required some kind of consensus but also because its open borders to countries with lower fuel standards.

Should Australia adopt more stringent CO2 emission targets for new vehicles and should these be voluntary or mandated?

CO2 emission limits should be mandated because voluntary agreements did not work neither in Europe (ACEA) nor in the US (CAFÉ).

The original Australian NAFC target of 6.8 l/100km for 2010 was equivalent to 163.2 g/km CO2 emissions for Petrol vehicles, based on the conversion rate published by the Department of the Environment, Water, Heritage and the Arts website: 1 liter petrol is equivalent to 2.4kg CO2 emissions. This already was much higher than the 140 g/km EU target for 2008.

[26] http://www.environment.gov.au/settlements/transport/fuelguide/environment.html

"In mid 2005, to reflect the need to reduce carbon emissions, a new industry target was established for a reduction in average CO2 emissions for all new light vehicles (< 3.5 tonnes gross mass) to 222 g CO2/km by 2010. Accordingly, this target incorporates a significantly broader range of vehicles (cars, SUVs and light trucks, etc.) and all fuel types (petrol, diesel, LPG, etc.)." This new target is not competitive and results in local products that can't compete in the global market place.

However, in 2007 the NACE for light cars was still just below 210g/km.

[27] FCAI NATIONAL AVERAGE CARBON EMISSIONS (NACE), Media release 31 March, 2008

A mandated CO2 emission target should be defined very wisely as a bonus/malus system to respect the advantages of Australian Industry. The CO2 target should be adjusted for different payloads compared to the kerb weight. This would be fair adjustment to help larger cars that can carry not only more load but more load in relation to their weight (and consequently also related to their CO2 emissions. Vehicles that are exceeding that target should be charged for these excessive emissions and vehicles with lower CO2 emissions should receive carbon credits, similar as through the enviro offset program that generates carbon credits by for example replacing light globes in household with energy saving ones. In that way the

Federal Government does not need to pay for the generated carbon credits, but the car companies could trade them if the want. For the vehicles exceeding the CO2 limits that would create extra income for the Government that can be used to finance even more CO2 saving technologies.

A standard payload/kerb ratio can be introduced, lets say 40%. Cars with a better ratio get a credit and cars with a lower ration are penalized. The formula would be the following:

CO2 adjusted = CO2 published x 40% / actual payload/kerb ratio

A practical example is shown in the following table:

		Hyundai Getz Auto	Ford Focus Petrol	Ford Focus Diesel	Ford Fiesta Manual	Ford Fiesta Auto	Ford Falcon Ute Petrol Auto	Ford Falcon Ute LPG Auto
CO2 published	g/km	165	189	154	153	176	265	244
CO2 adjusted	g/km	187	171	164	157	177	211	213
Kerb weight	kg	1131	1320	1418	1098	1123	1668	1718
GVM	kg	1530	1905	1950	1525	1570	2505	2505
Payload	kg	399	585	532	427	447	837	787
Payload/Kerb	%	35%	44%	38%	39%	40%	50%	46%

The numbers for the calculation are based on sales brochures, the Road Vehicle Certification Scheme database, and the Green Vehicle Guide. Because most Australian brochures for passenger cars don't have information on payload or gross vehicle weight (GVW) for some vehicles sales brochures from overseas were used.

[28] http://rvcs.dotars.gov.au/

[29] http://www.greenvehicleguide.gov.au/GVGPublicUI/ApplicationFirstStartTaskWebForm.aspx

[30] www.hyundai.com.au

[31] www.ford.de

Another option is to include currently unregulated emission compounds into new emission regulations. Nitrious Oxide (N2O) for example has a global warming potential that is 310 times bigger than CO2.

[32] AGO Factors and Methods Workbook, December 2006, Australian Government, Department of Environment and Heritage, Australian Greenhouse Office

In an SAE research paper it was reported that the ratio between unregulated N2O emissions and regulated NOx emissions could be between 7% and 52%. The Euro 4 NOx limit for Diesel cars is 4 times higher than for Petrol/LPG and CNG cars. Using an average of the reported N2O/NOx ratio of 24% means that the N2O related CO2 equivalent global warming potential of Diesel cars is another 12.6 g/km CO2 higher than Petrol cars. That means that even though Diesel cars consume less fuel they do not have a real advantage related to their global warming potential !

[33] Michael W. Meffert, Denis L. Lenane, Martin Openshaw and Joseph W. Roos, Ethyl Corp.: Analysis of Nitrous Oxide Emissions from Light Duty Passenger Cars SAE paper 2000-01-1952

With the latest state of the art emissions facilities available in Australia this is a chance to transform Australia from a slow follwower in the field of emissions regulations into a leading nations. With funding from the Victorian Government Ford Motor Company of Australia build an emissions lab that is probably World unique wide with its combination of capabilities. One of these new capabilities is an analyzer that can measure up to 30 different emission compounds (including N2O) additional to the currently regulated emissions of CO2, CO, NOx, HC and particulates. As a start this lab could be used to certify vehicles for the Australian market related to their N20 emissions.

[34] www.acart.com.au

What would be the impact on the industry of the adoption of more stringent emission targets?

In the short term it could make it more difficult for the local MVP as they would need to revise their cycle plans and budgets, but in the long term it is a chance to become more competitive in the global market.

What would be the impact on consumers and the automotive industry of ELV targets?

The costs involved would shift the burden from the future generations that have to compensate today's usage towards an arrangement where today's users also have to pay for its future impacts, so it will be more fair.

Are there ways of reducing greenhouse gas emissions through changes to Government taxation arrangements and other policies?

Converting the luxury tax into a CO2 based tax will be a start, introducing CO2 limits depending on payload would be a more sever but also more effective way of reducing GHG emissions. This could also be made progressive as the income tax scheme.

Should Australia consider taxes and charges based on, for example, kilometres travelled and vehicle emissions? What would be the impact on the industry of such arrangements?

Taxes should be based on a mixture between fuel consumed through the kilometers travelled, the type of fuel that is used, and the efficiency of the vehicle used. In that way it will be an incentive to buy efficient cars and clean fuels and to plan the travelling ahead. The impact will be that companies with intelligent strategies will benefit and inflexible companies will loose.

Should government procurement policies encourage the purchase of low emissions vehicles?

Yes, but this needs to be based on comparable metrics like CO2/km and not by mandating certain technologies. Although Governments are the biggest buyers of fleet vehicles where most are only driven to work and fill the car parks of our CBDs for most of the day, these non field usage vehicles could be much smaller as is the trend in Europe, especially in light, small diesel passenger vehicles.

Can Australia produce small fuel efficient vehicles?

The infrastructure and knowledge is available not only for the development of complete small vehicles (Ford of Australia has already developed the Indian version of its Fiesta), but also Ford has decided to produce the Focus that requires a complete new tooling compared to Falcon and Territory, so there is no reason why an even smaller vehicle can't be produced. Producing smaller vehicles is much easier than producing bigger vehicles as bigger vehicles require much stronger and bigger machines. So there is an argument that larger vehicles should have longer model runs to reduce major retooling and of course can currently be supplied on non petrol fuel alternatives such as LPG, that are cleaner and cheaper to run.

Do Australia's fuel standards and the Australian Design Rules inhibit imports of fuel efficient vehicles?

Yes.

Employment, Skills and Workplace Relations

Page 21 questions

What measures will contribute to sufficient and suitably skilled people being available to meet current and future demand in the automotive industry?

For the immediate future we need to build on the skills of our higher educated industry people in design, electronics and management. Especially those that have global experience in procurement and areas such as Live Cycle costing.

What workplace arrangements and practices in the automotive industry could best contribute to: innovation; the long term competitiveness of the industry; and a fair working environment?

Government bursary grants for “Best Practice” studies in major, key design and development centres that support OEM supply chains in Europe and the USa.

Are measures to support labour adjustment in the automotive sector achieving their aims?
What will be the key drivers of enhanced productivity in the industry over the medium to long term and how best can productivity improvements be accelerated?

Answer to all the above questions: there are 2 key issues:

1. Share options or other forms of employee participation in the equity of its employers company are a key for a high level of productivity and innovation. This is a common practice for senior management, but needs to be applied to all employees in particular to all payroll. Several studies showed that companies with such participation programs show between 25% and 30% higher productivity !
2. Company vision statement need to be based on intrinsic values rather than only based on profit maximization. Good examples are the following:

Toyota: Harmony with People, Society and the Environment

Microsoft had a compelling vision: "a PC on every desk and in every home“

Google's mission is to organize the world's information and make it universally accessible and useful.

Aldi: ‘Top quality at incredibly low prices — guaranteed’

Vehicle Safety

Page 23 question

Is the process and timeframe for changing standards appropriate in considering all stakeholder views, including those of consumers and industry?

Vehicle safety is the mostly overlooked reason for the shift from large cars to small cars. 12 of the 72 Super Mini Cars tested by NCAP between 1997 and now did achieve the best rating of 5 stars for adult safety, which is about 16 % of all super minis. That compares quite well with the results of Large Off roads 4x4 where only 3 of 17 cars achieved the same 5 start rating (about 18%).

Unfortunately none of the Australian produced large cars was able to achieve this prestigious 5 star rating. Perhaps Government should make local car manufacture a compulsory 5 Star rating, as it appears to be another major reason why there is a drift away from our large passenger cars produced locally.

So for customers that put their family's safety first when looking for a new car, they are better off if they buy a super mini or a small car.

In the small car segment 14 of 53 tested cars achieved the 5 stars: The Ford Focus, BMW 1 Series, Citroen C4, Fiat Bravo, Kia Cee'd, Mercedes A-Class, Nissan Qashgai, Opel (Holden) Astra, Peugeot 308, Renault Megane and Megane CC, Toyota Auris and Corolla, Volvo C30, and the VW Golf. Many of them also have a 4 star rating for child safety.

[35] www.euroncap.com

This equals to 26%, compared to only 18% of all large off road 4x4's this means small cars are much safer than large cars.

For consumers the timeframe for changing standards is too long. If there is enough evidence that a new technology will safe life's, these technologies should be introduced through a standard ASAP. The key question is "What is the cost of a life ?"

With its small numbers of manufacturers Australia has the great opportunity to become the globally leading nation in setting vehicle safety standards. The Government vehicle manufacturers need work closely together to define a strategy how to implement these standards rapidly. A great opportunity is Child S afety. Neither of the Supermini-, Small Family- or Large Off-road 4x4 cars have achieved a better rating than 4 stars.

Such leading standards could first act as trade barriers to protect the Australian people from relatively unsafe products (which ultimately will increase the sales volumes of local products) and secondly it's vehicles will be seen as global leaders related to safety which can generate further sales.

Effectively the European Union did the same with the introduction of the Euro 5 emissions regulations which means that cars designed for Australian Standards can't be sold in Europe if they are not upgraded. The US, and particularly California did the same with their most stringent emission standards for particulates emissions for Diesel vehicles. The introduction of Euro 3 emission standards in Australia had a similar effect to the importers of vehicle under the RAWS scheme. The type 6 emissions test at low temperature is very difficult to pass for vehicles built in Japan that are designed for the less stringent Japanese emission regulations.

But probably more important than further safety standards for passenger cars are safety standards for motorcycles and push bikes: Per vehicle miles traveled in 2004, motorcyclists were about 34 times more likely than passenger car occupants to die in a motor vehicle traffic crash and 8 times more likely to be injured " in the US.

[36] 2006 Motorcycle safety program plan, NHTSA (www.nhtsa.dot.gov)

Motorcycles and ATV's are also the biggest cause of child fatalities on farms in Australia.

[37] Australian Centre for Agricultural Health and Safety, National Farm Injury Data Centre, Farm Injury Newsletter Issue 20, July 2005

Also important are the training standards for getting a drivers license. These standards are much more stringent overseas. In Germany for example, even 30 years ago a minimum of 10 hrs practical driving education in a qualified school was required and the "examination" did include a practical driving test with a manual transmission including reverse parking sideways.

Such an extended training could also include some Eco-Driving components to teach people how to drive more economically. Ford studies eco-driving studies in Europe have demonstrated that drivers can reduce fuel consumption by up to 25% simply by changing their driving techniques. "By 2004, some 7,000 randomly recruited participants tested this real-world training course, and extensive consumer research – including in-depth psychological interviews and questionnaires – revealed excellent learning results and also long-term information retention with changed behaviour."

[38] http://www.ford-eco-driving.de/download/Eco-Driving-Leaflet-ENG-5-2004.pdf

Author:

Frank Will
100 Kurzmans Rd
Bellbrae
3228 VIC

frank.will@ino8.com
Phone: 0402 904 293

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[2] Quo vadis, automotive industry? A vision of possible industry transformation, M. Seidel, C. Koch, S Chahil, European Management Journal Vol. 23, 2005

[3] www.cyclingpromotion.com

[4] 2007 KPMG Global Auto Executive Survey

[5] http://www.euroncap.com/supermini.aspx

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[8] Robert Riley, SAE, Alternative Cars for the 21st century

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[17] Jeffrey Seisler: Natural Gas Vehicles on the European Agenda, in: Gas vehicles, the adequate answer to the CO2 challenge of the future ?, 2004

[18] REVIEW OF AUSTRALIA'S AUTOMOTIVE INDUSTRY 2008, BACKGROUND PAPER (assuming there was a typo on page 31 where the number 100 is missing as 13.8l/km is very high)

[19] Associated Press: http://ap.google.com/article/ALeqM5i5TtajgUpSm7KY5jf-lCJGHBB-tAD90FOE8O4

[20] ASPO-Australia, Australian Association for the Study of Peak Oil & Gas, www.ASPO-Australia.org.au, Deputy Convenor, Dr Sheridan M

[21] http://www.ford.de/ie/verbrauchswerte/-/-/-/-/-/-#90

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[25] http://greencar.us/2006/06/10/retro-fitted-toyota-prius-runs-on-cng/

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Appendix: Ozkar Vehicle Project Description, Executive Summary

Venture Description

Our business sector is Clean Tech, our opportunity is a low cost technology to improve safety, stability and driving dynamics of narrow vehicles, to foster clean transportation in particular vehicles like scooters, motorcycles or All Terrain Vehicles (ATV or Quads). ATV's are the biggest cause of child fatalities on farms in Australia /30/. 6500 ATV related deaths were reported in the USA between 1982 and 2003, and 704 in 2004 of which 31% were under 16 years of age /31/.

Our technology controls the centre of gravity in critical situations with a smart, intelligent suspension and real time management system. The key features of our technology are a

- Special chassis design and geometries
- Rapid control of tilting angles and steering force with an integrated damper/actuator.
- Frame with integrated functionalities.

The technology will be patented and sold to OEM's through licensing arrangements. The benefits for OEM's are that the technology addresses many of the actual social and economic trends. Licence agreements will generate a long term income stream which more than compensates for the time and risk it takes to develop and sell this technology. The income will also enable the development of further new technologies in the future to ensure a sustainable business success.

Business Opportunity

Besides the safety issues of ATV's and motorbikes several other trends will be addressed as well. Some of the most important trends that will be addressed are:

- Global warming including CO2 trading
- Increasing fuel prices
- Less parking space available in cities
- Traffic congestions are getting worse
- Most journeys are done with the driver only
- High growth rate of the light car segment
- Increasing popularity of fun sports
- Over-capacity in developed markets – need to be filled with new products like Ozkar

Industry

The global automotive industry is in a mature state although the world automotive production is still growing, mainly driven by the growth in China with a size close to 60 million vehicle in 2003. The global motorcycle market is a bit more that half this size, 32.9 Million with a predicted annual growth of 4.9% until 2009. The competition is enormous forcing the OEM's to enter as many niche markets as possible Examples for these niche market segments are cross over vehicles that combine features of various different conventional vehicle types. The specific segment of safe narrow tilting vehicles is transitioning into the growth stage with about one new product being introduced per year.

Sales Strategy

Income will be generated in various ways in different phases:

1. Sell licences for mass production to OEM's.
2. Engineering/consulting services: selling the experience gathered during the development of Ozkar during the implementation of similar project to OEM's, component or system suppliers, or manufacturers of motorcycles, bicycles, quads, or mobility scooters
3. Build & sell aftermarket conversion kits for existing vehicles

4. Build & sell prototypes to enthusiastic end customers
5. Build & sell prototypes modified to the special requirements of OEM's e.g. with different dimensions, performance, powertrain configurations, designs, number of seats, etc.

These sales will be generated mainly by direct marketing to the individual contacts within the potential customer companies. This has proved to be very effective and helps to minimise the sales expenses.
Public interest will be generated by two significant events:

1. World record trials
2. Competing in the Auto X-Prize competition for vehicles with a fuel economy better than 100 miles per gallon with prizes worth US $ 10 Million

Team

The inventor and CEO, Mr. Frank Will, is a professional automotive engineer holding a MSc in Mechanical Engineering and a MBA from Henley Management College. He manages the Emissions- and Environmental Laboratories with 50 employees at Ford Motor Company of Australia.

Another key person is Prof. Saeid Nahavandi, he holds the Chair in Engineering and is leading the Intelligent Systems Research Lab at Deakin University. He has carried out teaching and research since 1986 in the UK, Australia, New Zealand, USA and Thailand. Dr. Nahavandi has won many competitive research grants as well as industry funded research programmes.

Financials

After the fifth year **an EBIT of $6.4M** or more than 3 times of the investments of 2.1 Million will be generated equivalent to a Return on Investment of 230%. Subsequent profits will be even higher. Ultimately the royalties will increase up to **$100Million per year** – 2.5% of a retail price of $20k for a full production of 200,000 units p.a.

A continuous cash flow will be generated starting in the second year of operation by consulting fees to modify and integrate the patented technologies into customer projects as well as selling the first prototypes to collectors of exclusive vehicles.

Next steps

$ 600.000 cash are required to support the funding through the Government Grant programs worth $ 2 Million to develop and refine initial functional prototypes, to ensure global patent protection and to market the technology to global OEM's and component suppliers.

Value Proposition

There are several advantages of our technology compared to conventional light cars and motorcycles that add measurable value to the customer:

- Combines safety of a car with the fun to drive a Harley Davidson
- Reduced costs for fuel worth $7,500
- Reduced costs for parking space in cities worth $10,000
- Can be driven with car driver's licence.

Status

- Company started in December 2006
- COMET support secured in September 2007
- Cooperation with Deakin University started in November 2007
- Strong interest for collaboration has been indicated by a very successful motorbike and ATV manufacturer.
- Prototype build has started.