Automotive Catalysts
At a glance

- Complete automotive catalyst system offer for reduction of exhaust gas emissions
- One of three world leaders
  - 30% market share in light duty market (passenger cars)
  - Establishing a growing position in heavy duty segment
- R&D intensive business with R&D expenditure > 10% of revenues (ex pgm)
- Globally positioned
  - 5 regional R&D/test centres
  - 11 plants, on 5 continents

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### Automotive Catalysts Production and Development Facilities

**Footprint # 1,723 people (235 in associates)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Activities</th>
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<tbody>
<tr>
<td>Burlington, Canada</td>
<td>Production</td>
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<tr>
<td>Auburn Hills, USA</td>
<td>Test centre, Production</td>
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<tr>
<td>Tulsa, USA</td>
<td>R&amp;D satellite, Production</td>
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<td>Americana, Brazil</td>
<td>Test centre, Production</td>
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<td>Port Elisabeth, S-Africa</td>
<td>Production (2 plants)</td>
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<td>Florange, France</td>
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<td>Rheinfelden, Germany</td>
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<td>Karlskoga, Sweden</td>
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<td>Suzhou, China</td>
<td>Production</td>
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<td>Hanau, Germany</td>
<td>Headquarters, R&amp;D &amp; test centre</td>
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<tr>
<td>Himeji, Japan</td>
<td>ICT (50% JV), R&amp;D &amp; test centre, Production</td>
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<td>Ordeg (50% JV), Korea</td>
<td>Test Centre, Production</td>
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Automotive Catalysts
Car market and Umicore’s position

- Global position of some 30% similar to other global players Johnson Matthey and BASF

- Regional positions
  - Market leader (#1 or #2 position)
  - Smaller player (distant #3)

Circles indicative of 2009 car production volumes (≠ catalyst revenues)

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Automotive Catalysts
Automotive production

- Car production drives the results
- Tightening emission norms will further drive catalyst requirements
- Future car production growth primarily coming from emerging countries

Developed regions
(in million cars)

Emerging markets
(in million cars)

Source: CSM
Automotive Catalysts

Business model

Development phase
- Catalyst & emission system architecture
- Contract negotiation

Production phase
- Substrate manufacturer
- Catalyst manufacturer
- Canner
- Car/engine manufacturer
- End consumer

End-of-life phase
- Recovery of precious metals from automotive catalysts (in business unit PMR)

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Automotive Catalysts

Business drivers

• Emission legislation
  • Tightening in Western world
    Next standards up to 2015 already planned
  • Implementation in emerging countries
    E.g. China and India
  • Application to new sectors as Heavy Duty
    For non-road and later also non-road vehicles

• Technology
  • Engine development
    • Fuel efficiency (HEVs, lean-burning engines, …)
    • Fuel (Gasoline / Diesel, Bio-fuels, …)
  • Catalyst technology with main goal to thrive the precious metal content
Automotive Catalysts
Medium term emission legislation

- In Europe, Euro VI will bring more stringent emissions norms in 2011 – 2014, clearing the way for Euro VII which will tighten legislation further between 2015 and 2017

- In North America, LEV III likely to be introduced by 2015 making Federal and State requirements consistent with California regulations (SULEV)

- Legislation in Asia and developing countries will tighten further, catching up with Western emission norms

- HDD legislation will gradually increase for on-road and off-road applications, US in 2010, Europe in 2014 and other regions will follow
Automotive Catalysts
Business strategy

- Grow the core business while maintaining technology and profitability
- Improve global position with Japanese car manufacturers
- Continue to develop our market position in emerging markets
- Establish a meaningful position in the Heavy Duty Diesel segment
Asia-Pacific Vehicle Production Forecast

Light duty vehicle production

(in million units)

Main growth in the world’s vehicle production to come from China
Asia Pacific

Continued tightening of emission norms

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Europe on-road
EU Stage IIIA | EU Stage IIIB | EU Stage IV

EU off-road
EU Stage IIIA | EU Stage IIIB | EU Stage IV

USA on-road
USA Tier II / Tier III | USA Tier IV Interim | USA Tier IV Final

USA off-road
USA Tier II / Tier III | USA Tier IV Interim | USA Tier IV Final

China on-road
Euro III | Euro IV | Euro IV

China off-road
Euro III | Euro IV | Euro IV
Automotive Catalysts in Asia Pacific
Japan

- Joint Venture: 50:50 with Nippon Shokubai
- Established in 1991
- Local production and R&D capabilities. Investment into new production technology and additional capacity was implemented in 2008
- Technology Portfolio: three way catalyst (TWC), Diesel, HDD & solutions for NOx abatement
Automotive Catalysts in Asia Pacific
China

- Fully-owned: Umicore Autocat Catalysts China Corp. – established in 2005
- Chinese market was initially developed through production support from other entities in Asia-Pacific until critical mass for local production was reached.
- Continuous expansion of local capacity both in TWC, Diesel and HDD with additional capability coming online in 2010
- Establishment of local capability for technical development with customers
- Technology Portfolio: TWC, Diesel, HDD & solutions for NOx abatement
- Local system engineering capability
- Strong position with global OEMs and Chinese producers
Automotive Catalysts in Asia Pacific
Korea

• Joint venture: 50:50 with Korean Partners
• Established in 1985
• Local production facilities and Technical Center. New investment into upgrade of production technologies completed in 2007 and new production capacity came online in 2009
• Technology Portfolio: TWC, Diesel, HDD, & solutions for NOx abatement
• Local capability for development and system engineering to support the initiatives with Korean OEMs and other customers in Asia Pacific including HDD
Automotive Catalysts in Asia Pacific
India & South East Asia

- Local Sales & Applied Technology office in Pune and Sales Office in Thailand
- Global OEMs are supported by Umicore Customer Teams
- Greenfield site for production facility has been identified and land purchased in India. Further progress will depend on evolution of Indian market and legislation to a critical level
- Technology Portfolio: TWC, Diesel, HDD
Umicore Automotive Catalysts in Asia Pacific
Footprint # 540 people (384 in associates)

- Onsan, Korea
  - Test Centre
- Onsan, Korea
  - Production
- Himeji, Japan
  - R&D & test centre
  - Production
- Suzhou, China
  - Production
- Pune, India
  - Marketing & Sales office
- Melbourne, Australia
  - Sales and Engineering office
Automotive Catalysts
Current investments in Asia Pacific

• Expansion of production and testing facility
  • Onsan/Ansan, South Korea
  • Additional development capability planned for post 2010

• Expansion of production capacity & capability
  • Suzhou, China
  • Additional Investment approved for 2010
Automotive Catalysts: Focus on China
China is the largest car producing country in the world today and is set to equal North-America in 2015, producing over 18% of the world’s cars.
China power train forecasts

Gasoline remains the dominant fuel type for light duty power trains

Pick up on low level for alternative concepts

Source: CSM + J.D. Power + PSR
LDV and HDV
China light duty legislation update

Effective implementation date

<table>
<thead>
<tr>
<th>Date</th>
<th>Legislation Level</th>
<th>Implementation Location</th>
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<tr>
<td>Jul. 1999</td>
<td>Converter assurance standard</td>
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<td>Jan. 2000</td>
<td>EUI</td>
<td>Implemented in China (Beijing)</td>
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<td>Jul. 2004</td>
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<td>Jul. 2011</td>
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<td>1999</td>
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<td>Implemented in Beijing (Nov. 2009 Shanghai)</td>
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<td>2012</td>
<td>EUV</td>
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All production, sales, and registration must apply for the latest legislation.

Current programs (in production) have a one year grace period prior to complying with the new legislation.
China heavy duty legislation update
Effective implementation date

- Jan. 2003
  EUI
  Implemented in China

- Sept. 2003
  EUII implemented in China

- Dec. 2005
  EUIII implemented in Beijing

- Jan. 2008
  EUIII implementation in China

- Jan. 2011
  EUIV implementation in China

- Jan. 20xx??
  EUV implementation in China

All production /sales/registration must apply for the latest legislation.

Current programs (in production) have a one year grace period prior to complying with the new legislation.
China 2009 market review

• Production was up 46.9% from 2008 (source: CSM)

• Sales benefited from government incentives:
  • Reduction of vehicle ownership cost
  • Sales premium (max 5k RMB) for replacing three wheelers and light trucks by minibuses
  • Tax reduction from 10% to 5% for engines below 1.6l displacement
  • Car replacement premiums of 3k RMB to 6k RMB
China 2010 market preview

• Production is estimated to increase by 12.5% (Source: CSM)

• Government incentives are being upscaled or held in place compared to 2009
  • Purchase tax for vehicles under 1.6l is cut to 7.5% until 31 dec 2010
  • The subsidy for vehicle in “old for new policy” is raised to maximum 18K RMB from max 6K RMB
  • The ‘car to rural’ and ‘motorcycle to rural’ policies will respectively be extend until the end of 2011 and 31st January 2013
  • The energy-saving and new energy vehicles awarding demonstration and pilot cities will be extended to 20 cities from the original 13 cities

• Despite strong growth, the production base is moving into overcapacity

• Longer term moves towards industry consolidation
Chinese industry consolidation

• Government is seeking to cut the number of major auto groups from 14 to 10
• Support the major Chinese auto groups to develop their own brands
Umicore’s strategy for Asia Pacific region
Five key elements

Technology Management
Have intimate knowledge of market and applications in the region and be willing to adapt with technological solutions that address local needs.

HR Management
Establish HR as an advanced function rather than an afterthought, give it exposure and require it to address recruitment, development and retention.

Risk Management
Thoroughly understand the current risks and address them, developing an organizational culture which addresses risk in a proactive manner on every level and has the audacity to expose it.

Future Growth Management
Pursue new markets, regions and new customers. Consider resource requirements and take a selective view of these opportunities with focus on future fit and sustainability.

Asset Management
Develop a flexible and innovative approach to address the investment needs. The approach must balance the need for standardization against that of cost management.