R&D: FUTURE-PROOFING THE BMW GROUP.

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March 20, 2013
OVERVIEW.

1. Challenges in the automotive industry
2. Our solutions
3. Evolution and revolution
5. Summary
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GLOBAL TRENDS IMPACT ON PERSONAL MOBILITY. R&D MUST DELIVER NEW SOLUTIONS.

Environment
Climate change and its knock-on effects

Urbanisation
By 2030, over 60% of the world’s population will live in cities

Customer Expectations
Changing values

DRIVING FACTORS

Economics
Dwindling resources, rising fossil fuel prices

Culture
Sustainable mobility as part of a modern urban lifestyle; taking social responsibility

Politics and Regulations
CO₂ and fleet regulations, import restrictions
COMPARISON OF CO₂ FLEET REDUCTIONS IN EUROPE. BMW GROUP HAS ALREADY ACHIEVED A GREAT DEAL. TOUGH TARGETS TO COME.

BMW Group has more than fulfilled its contribution to the ACEA commitment to reduce fuel consumption by 25 % from 1995 to 2008.

EU fleet emissions (g CO₂/km)

BMW Group

ACEA

2011: 145g/km

2011: 136g/km

2015 = 130 g/km*

2020 = 95 g/km*

EU COM target = Ø fleet emissions (EU-27)

*Manufacturers get individual targets, which may be above or below the value of the Ø EU Com fleet emissions, depending of their individual Ø weight.

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   Managing growth & profitability: Process chains, architecture, modular systems
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OUR DUAL-TRACK APPROACH SETS A CLEAR DIRECTION FOR R&D.

Evolution
Efficient combustion engines
–EFFICIENT DYNAMICS/MINIMALISM–
Innovative technologies

Revolution
Alternative drivetrains
Mobility services
Innovative materials and processes
PURPOSE-BUILT DESIGN – THE BMW i LIFEDRIVE CONCEPT.

- BMW dynamic driving performance
- Vision: Clean production
- Optimized integration of electric drive system
- Visionary design language
- Innovative key technologies: CFRP & electric motor
- Free forms in interior and exterior design
- Easy to update with changing technologies
- Social sustainability
- Customer-friendly e-mobility concepts
- Integrated high-voltage component safety concept

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Without a Modular Strategy, a three-fold increase in model numbers would send costs and resources spiralling along the process chain. The Modular Strategy enables shorter development cycles and enhanced flexibility in our plants.
THE MODULAR STRATEGY IS THE ENABLER FOR THE EXPANSION OF THE BMW GROUP MODEL RANGE.

Architectures
- Underbody
  - Front seat attachments

Modular product
- Modular front seat
  - Common elements
    - Structure
    - Head restraint

Modular system
- Front seat attachment
  - Standardised seat installation process

- Lower investment costs
- Lower fixed costs
- Shorter development time
- Shorter time to market
- Lower manufacturing costs
- Lower development costs
THE NEW BMW EFFICIENTDYNAMICS ENGINE FAMILY – HIGH LEVELS OF COMMONALITY BETWEEN AND WITHIN DIESEL AND GASOLINE ENGINES.

Cylinders (inline) | -3 | -4 | -6

**Gasoline**
- Common parts shared within gasoline or diesel engines are approx. 60%.
- Between the gasoline and diesel engines there is a 40% sharing.

**Diesel**
- >60%
COMMON ARCHITECTURE, NOT PLATFORMS. IN PREMIUM VEHICLES DIFFERENTIATION IS KEY.

BMW Group architecture = 3 core areas.

BMW Group architectures allow maximum differentiation between models in terms of design and dimensions and account for about 70% of all production cost.
PROCESS CHAINS PROVIDE EFFICIENT PRODUCT DEVELOPMENT PROJECTS.

Process chains bundle development-, purchasing- and manufacturing-skills and deliver faster and better solutions for product variety

→ Modules & standards for all products
→ Best practice solutions for all products
→ Acceleration of decision-making and processes
ECONOMIES OF SCALE ACHIEVED THROUGH MODULAR SYSTEMS AND COMPLEXITY MANAGEMENT ALMOST ON PAR WITH VOLUME MANUFACTURERS.

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SUMMARY.

CHALLENGES

- Manage growth and complexity
- Achieve CO₂ and emissions targets
- Manage variety of new technologies

APPROACHES

- Optimization of process chain management
- Architectures
- Product and process modules
- Electro mobility

OBJECTIVES

- Efficiency in R&D, purchasing and production
- Profitable growth
- Further technological leadership