Matthias Zink – Today’s Automotive speaker

Matthias Zink (48)
CEO Automotive

- 1994: Joined the Schaeffler Group as research engineer at LuK in Bühl
- Until 2006: Various leadership positions within the Business Division Transmission Systems
- 2006 – 2012: Head of the Business Unit Clutch Systems
- 2012 – 2014: Head of Schaeffler Automotive Asia/Pacific
- 2014 – 2016: Head of the Business Division Transmission Systems
- Since 2017: Member of the Executive Board of the Schaeffler AG as CEO Automotive
  Executive Board Sponsor of E-Mobility at Schaeffler

23 years with Schaeffler
2 Overview Automotive

Automotive division – At a glance

Sales and EBIT margin

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales (mn)</th>
<th>EBIT (F/X adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>8,164</td>
<td>13.2%</td>
</tr>
<tr>
<td>2014</td>
<td>8,986</td>
<td>14.0%</td>
</tr>
<tr>
<td>2015</td>
<td>9,977</td>
<td>13.8%</td>
</tr>
<tr>
<td>2016</td>
<td>10,388</td>
<td>14.3%</td>
</tr>
<tr>
<td>H1 2017</td>
<td>5,182</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

Growth rate (y-o-y)¹ +8.6% +10.7% +5.8% +6.0% +4.3%

¹) FX adjusted

Automotive sales by region H1 2017

- **Greater China**: +20.2% (+22.5%)
- **Asia/Pacific**: +10.1% (+6.8%)
- **Europe**: -0.7% (-1.1%)

Sales H1 2017: EUR 5,455 mn

Automotive sales by Business Division H1 2017

- **Aftermarket**: +2.3% (+0.8%)
- **Chassis**: +3.0% (+1.7%)
- **Engine**: +5.7% (+4.8%)
- **Transmission**: +7.1% (+6.3%)

Sales split by customer mix H1 2017

- **Top 10 automotive customers**: 60%
- **Other customers**: 40%
Unique selling points

- Global R&D network and exceptional innovative spirit
- System expertise with outstanding powertrain and simulation competencies
- Strong mechanical background with a high degree of vertical integration
- Operational and manufacturing excellence with a global production footprint

Automotive chronology

Exemplary highlights

Complexity


Component expertise

Simulation know how

System know how

Sustainable & profitable growth through innovation
Key market drivers

1. CO₂ and emission legislation
2. E-Mobility
3. Fierce competition & affordability
4. Regional & urban trends

Four Automotive mega trends

- CO₂ Reduction/Zero Emission
- Autonomous Driving
- Connected Cars
- Shared Mobility

Key Innovation Fields
3 Market Development

Powertrain scenario – The market is moving towards the accelerated scenario

**Accelerated Scenario**
Global vehicle production [in mn units]

- CAGR 2010/2030: +2.4% p.a.

<table>
<thead>
<tr>
<th>Year</th>
<th>ICE</th>
<th>HEV</th>
<th>BEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>74</td>
<td>99%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>89</td>
<td>97%</td>
<td></td>
</tr>
<tr>
<td>2020e</td>
<td>101</td>
<td>85%</td>
<td>13%</td>
</tr>
<tr>
<td>2025e</td>
<td>111</td>
<td>35%</td>
<td>15%</td>
</tr>
<tr>
<td>2030e</td>
<td>120</td>
<td>50%</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Regionalized Accelerated Scenario 2030**
Global vehicle production [in mn units]

<table>
<thead>
<tr>
<th>Region</th>
<th>ICE</th>
<th>HEV</th>
<th>BEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMEA</td>
<td>29</td>
<td>36%</td>
<td>24%</td>
</tr>
<tr>
<td>North America</td>
<td>19%</td>
<td>41%</td>
<td>41%</td>
</tr>
<tr>
<td>South America</td>
<td>45%</td>
<td>35%</td>
<td>20%</td>
</tr>
<tr>
<td>Greater China</td>
<td>43%</td>
<td>37%</td>
<td>37%</td>
</tr>
<tr>
<td>India</td>
<td>9</td>
<td>22%</td>
<td>75%</td>
</tr>
<tr>
<td>Korea</td>
<td>4</td>
<td>22%</td>
<td>52%</td>
</tr>
<tr>
<td>Japan</td>
<td>9</td>
<td>28%</td>
<td>57%</td>
</tr>
<tr>
<td>SEA</td>
<td>6</td>
<td>33%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Source: IHS and Schaeffler Assumptions / Values based on Light Vehicles < 6 tons only, ICE = Internal Combustion Engine; HEV = Hybrid Electric Vehicles ranging from 48V Mild Hybrid to PHEV, BEV = Battery Electric Vehicles (incl. Fuel Cell Electric Vehicles)
Hybrid technology – "Why do we expect 40%-HEV share in 2030?"

**Accelerated Scenario 2030**

- **30% BEV**
  - 48V
  - Infrastructure
  - Range
  - Battery cost

- **40% HEV**
  - HEV ranging from 48V up to PHEV
  - Fun to drive
  - HEV architectures

- **30% ICE**
  - ICE incl. Micro-Hybrid
  - Emissions
  - Governmental restrictions

**Drivers of HEV**
- Several HEV architectures ranging from cost efficient 48V solutions up to highly electrified Plug-In Hybrids
- 48V solutions with high benefit to cost ratio
- Necessity to keep up with mid-term CO₂ targets and legislation
- Fun to drive – the best of both worlds, less emission with more power and range

**Constraints of pure ICE and BEV**
- Emission target compliance requires more technology and drives powertrain cost with worse cost/benefit compared to HEV
- Governmental restrictions e.g. localized ban of Diesel engines
- Limited charging infrastructure for BEV
- Reduced driving range
- Battery cost and battery production capacities
### 3 Market Development

**Powertrain concepts and electrification levels – Wide variety of hybrid solutions**

<table>
<thead>
<tr>
<th></th>
<th>30% ICE</th>
<th>40% HEV</th>
<th>30% BEV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICE and Micro-Hybrid</strong></td>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
<td><img src="image3" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Mild Hybrid</strong></td>
<td><img src="image4" alt="Diagram" /></td>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Full Hybrid</strong></td>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
<td><img src="image9" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>P-HEV</strong></td>
<td><img src="image10" alt="Diagram" /></td>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>BEV</strong></td>
<td><img src="image13" alt="Diagram" /></td>
<td><img src="image14" alt="Diagram" /></td>
<td><img src="image15" alt="Diagram" /></td>
</tr>
</tbody>
</table>

#### E-Motor position
- **P0**
- **P2**
- **P3**
- **P4**

#### Voltage
- **12 Volt**
- **48 Volt**
- **High Voltage**
- **High Voltage**
- **High Voltage**

**30% ICE**
- **ICE and Micro-Hybrid**

**40% HEV**
- **Mild Hybrid**
- **Full Hybrid**
- **P-HEV**
- **BEV**

**48 Volt**
- **E-Motor position**
- **Voltage**

**30% BEV**
- **BEV**
4 Long-Term Growth Opportunities – E-Mobility

E-Mobility as our key growth driver – 8 series contracts and >20 ongoing customer projects

Hybrid Module
- with integrated Torque Converter
  - Tier 1
  - SOP Q4/2018

1-Gear Electric Axle
- Front + Rear
  - Tier 1
  - SOP Q3/2018

1-Gear Electric Axle
- Front
  - Tier 1
  - SOP Q3/2019

Hybrid Module
- Tier 1
  - SOP Q1/2018

2-Gear Electric Axle
- Rear
  - Tier 1
  - SOP Q4/2017

North America

Europe

Greater China

Hybrid Module
- 2 series contracts
- More than 10 ongoing customer projects

E-Axle
- 6 series contracts
- More than 10 ongoing customer projects

July 20, 2017

Capital Markets Day 2017 – Automotive
4 Long-Term Growth Opportunities – E-Mobility

E-Mobility – How we ramp up

July 20, 2017

Capital Markets Day 2017 – Automotive
<table>
<thead>
<tr>
<th>Powertrain concepts – Product highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>30% ICE</strong></td>
</tr>
<tr>
<td>ICE and Micro-Hybrid</td>
</tr>
<tr>
<td><strong>A</strong> Hybrid Module</td>
</tr>
<tr>
<td><strong>B</strong> E-Axle</td>
</tr>
<tr>
<td><strong>C</strong> Thermal Management Module</td>
</tr>
<tr>
<td><strong>D</strong> E-Clutch</td>
</tr>
<tr>
<td><strong>E</strong> Chassis Systems</td>
</tr>
</tbody>
</table>
Hybrid Module product portfolio

1. System solution (Tier 1)
   Potential content range: EUR 700 – 1,300

2. Component & modular solution (Tier 1 & 2)
   Potential content range: EUR 50 – 500

Our USPs
- Compact design with integrated & electro-mechanical/hydraulic clutch actuation
- Reduced axial space requirements due to packaging solutions
- Possibility to integrate power electronics unit

Key aspects
- Available as 48V & high voltage solution
- Adaptable to all transmission types & optimized to perfectly fit our customers’ distinct powertrain requirements

Car-segments and regional facts
- From 48V entrance hybridization to high voltage Plug-in solutions
- For all segments and regions applicable

Concept car
E-Axle product portfolio

1. System solution (Tier 1)
   Potential content range: EUR 800 – 1,600 (per E-Axle)

2. Component & modular solution (Tier 1 & 2)
   Potential content range: EUR 50 – 800

Our USPs

- Best-in-class power density
- Highly adaptable solution for 48V and High Voltage applications, with 1- or 2-speeds and in parallel or coaxial design
- With optional Torque Vectoring unit for improved driving dynamics

Key aspects

- Acquisition of Compact Dynamics (E-Machine)
- Cooperation initiated with Semikron (Power Electronics)

Car-segments and regional facts

- E-Axles as electrical all-wheel drive interesting for hybrids in all segments
- Due to highly modular concept, applicable to BEV in all segments and regions

Concept car
Key aspects

- OEMs have the option to in- or outsource their E-Mobility solutions
- Outsourcing OEMs can use Schaeffler as a Tier 1 supplier of systems or a Tier 2 supplier of components and modular solutions
- Insourcing OEMs can rely on components & modular solutions by Schaeffler

E-Mobility Market Volume\(^1\)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM in-house</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEM outsourced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Schaeffler estimated E-Mobility Market for Powertrain systems

2 Component & modular solution (Tier 1 & 2)

Potential content range:
EUR 50 – 800

1 System solution (Tier 1)

Potential content range:
EUR 700 – 1,600
### Key aspects

- Schaeffler’s best in class & highly integrated Thermal Management Module already in series production with large OEMs
- Impressive market growth for thermal management solutions far beyond 2020 with a CAGR of > 20% over the next 10 years
- Thermal management for HEV/BEVs provides even further market opportunities (e.g. for battery and power electronics cooling)

### Car-segments and regional facts

- Relevant for all regions & segments
- Car-segment specific differences in complexity of thermal management

---

**Thermal Management Module product portfolio**

**Market forecast [mn units]**

- **Today**: ~ 4
- **+10 years**: > 30

**CAGR > 20%**

**Average Price: EUR 40**

**In series production**

-----

**ICE**

**BEV**

**HEV**
E-Clutch product portfolio

Key aspects

- E-Clutch enables coasting with Manual Transmissions (MT) and saves up to 8% CO$_2$
- Highly suited for mild hybridization of the powertrain
- Accelerated Scenario predicts high volume of Manual Transmissions in 2025 (>36 mn)
- Strong market growth of E-Clutch over the next 10 years expected (> EUR 1 bn)
- Avg. content per MT will increase by ~30%
- Market share target 2022: ~45%

Car-segments and regional facts

- Focus Car Segments: A - D (Small-Mid-Size)
- Focus Regions: China and Europe

Price range: EUR 110 – 260\(^1\)
First SOP: 05/2018

\(^1\) Depending on actuator type and E-Clutch concept
Mechanics components & mechatronic systems

Key aspects
- Chassis components and systems are independent of powertrain concept
- Main applications are suspension, steering, braking, wheel modules and Mechatronic Active Roll Control
- Stricter requirements in electrified vehicles provide further market opportunities (e.g. NVH, weight and friction)
- Increased requirements for comfort in automated driving provides additional potential business (e.g. Actuation)

Car-segments and regional facts
- For all segments and regions applicable

Price range: EUR 5 – 550
- In series production

1) Depending on product
2) Incl. in Demo Car; not in series production
3) Noise, vibration, harshness
Our growth formula – Why do we believe in continued outperformance?

Content per Vehicle 1)

in EUR

1) Average Schaeffler Content per light Vehicles produced worldwide (excluding Aftermarket, Heavy Duty & Motorcycles content) 2) according to Schaeffler Accelerated Scenario 3) Market Growth 2016–2025: 1.8% (Source: IHS, July 2017) + Content per Vehicle growth ~4%
## E-Mobility dashboard – Monitoring transition

### Market development

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>H1 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEV</td>
<td>0.5 (0.6%)</td>
<td>0.4 (0.8%)</td>
</tr>
<tr>
<td>HEV</td>
<td>2.7 (2.9%)</td>
<td>1.6 (3.3%)</td>
</tr>
<tr>
<td>ICE</td>
<td>89.9 (96.5%)</td>
<td>45.3 (95.9%)</td>
</tr>
</tbody>
</table>

### Sales

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>H1 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEV</td>
<td>14 (0.2%)</td>
<td>12 (0.3%)</td>
</tr>
<tr>
<td>HEV</td>
<td>170 (2.1%)³</td>
<td>105 (2.4%)</td>
</tr>
<tr>
<td>ICE</td>
<td>7,880 (97.7%)³</td>
<td>4,160 (97.3%)</td>
</tr>
</tbody>
</table>

### Order Book

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>H1 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Series Contracts</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Lifetime Sales</td>
<td>~EUR 750 mn</td>
<td>~EUR 1,150 mn</td>
</tr>
</tbody>
</table>

### Resources

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>H1 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capex</td>
<td>EUR 29 mn</td>
<td>EUR 40 mn⁶</td>
</tr>
<tr>
<td>R&amp;D Invest</td>
<td>EUR 35 mn</td>
<td>EUR 38 mn⁶</td>
</tr>
<tr>
<td>△HCO</td>
<td>+259</td>
<td>+254</td>
</tr>
</tbody>
</table>

### Target 2020

1. # BEV > 2,000
2. # HEV > 13,000
3. HEV + BEV Sales > 15% of total sales of Schaeffler Automotive
4. Resources EUR 500 mn add. invest add. 1,200 △HCO

---

¹ IHS Light Vehicle Production Forecast, July 2017  
² Excluding Aftermarket, Heavy Duty & Motorcycles  
³ Adjusted due to Reclassification of HEV-Vehicles  
⁴ Only Hybrid Modules and E-Axles  
⁵ Only ongoing Customer Project  
⁶ Ytd Estimates

---

**Status as of Q1 2016 currently under review**
Today

- Pre-development
- Project Culture
- E-Axle
- Manufacturing
- Customer Interface
- HZA
- EU
- BHL
- US
- Prototyping
- Hybrid Module
- Purchasing

As of January 1st, 2018

Bundling of the E-Mobility activity at Schaeffler to advance the transition towards E-Mobility by:

- Presenting one face to the customer
- Creating R&D synergies
- Quicker decision making processes
- A unified controlling to monitor progress
4 Long-Term Growth Opportunities

New order intake – Continuous strong growth

<table>
<thead>
<tr>
<th>Key aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Introducing the Schaeffler Order Intake – the orders taken by the Automotive Division in a given time period</td>
</tr>
<tr>
<td>- It will be released in half-yearly intervals from 2018 onwards</td>
</tr>
<tr>
<td>- The last three years were recreated before system change and show strong order growth</td>
</tr>
<tr>
<td>- Schaeffler estimates the Order Intake to convert to the annual Net Sales in ~5 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Automotive OE Order Intake&lt;sup&gt;1)&lt;/sup&gt;</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>in bn EUR</td>
<td>H1</td>
<td>H2</td>
</tr>
<tr>
<td>2014&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>4.9</td>
<td>4.8</td>
</tr>
<tr>
<td>2015&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>6.7</td>
<td>5.2</td>
</tr>
<tr>
<td>2016&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>7.2</td>
<td>5.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Book to Bill Ratio&lt;sup&gt;2)&lt;/sup&gt;</th>
<th>H2</th>
<th>H1</th>
<th>FY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>1.2</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>2015&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>1.3</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>2016&lt;sup&gt;3)&lt;/sup&gt;</td>
<td>1.4</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Received orders in given time period  
<sup>2)</sup> Order Intake/Net Sales  
<sup>3)</sup> Estimates due to system change  
<sup>4)</sup> Excluding Automotive Aftermarket
Sales Growth until 2020

> +4%-pts above market\(^1\)

Key aspects

- In 2020 > 95% are either booked business or customer projects that are already initiated

Key growth drivers

1. Fully variable valve train system UniAir with several OEMs e.g. Jaguar Land Rover
2. Thermo Management Module in several large programs
3. Ramp-up of several large E-Mobility projects worldwide
4. Large projects for Automatic and CVTs. Double-Clutch Transmission projects with local OEMs and Joint Ventures in China
5. Mechatronic Active Roll Control (iARC) with several Premium OEMs e.g. BMW
6. Increasing demand for Aftermarket repair solutions

\(^1\) Market Growth 2016-2020: 2.2\% (Source: IHS; July 2017)
Market is shifting towards an accelerated scenario with a strong hybrid powertrain share; Ramp up of eight E-Mobility series contracts plus over twenty ongoing customer projects.

Diverse product portfolio for all powertrain concepts with an expected Content per Vehicle growth from EUR 85 to EUR 130 over the next 10 years.

Newly founded Business Division E-Mobility will align key activities, streamline decision making and create synergies in the market transition.

Strong order intake supports our out-performance of the global market by at least 4%-pts until 2020 with expected profitability remaining at a high level.