Driving Volkswagen AG into the future

9 April 2016
Strategy 2018
4 key goals established in 2007

1. Leading in customer satisfaction and quality
2. Volumes of >10 mn units sold per annum
3. Volkswagen Group PBT margins of >8%
4. Top employer

Source: Case material, company website
Disruption of Strategy 2018

Calculating the financial and non-financial impacts of the emissions issue

Source: Argon estimates, broker reports, press search
Disruption of Strategy 2018

Calculating the financial and non-financial impacts of the emissions issue

Implication

These high costs necessitate a strategic transition to **Strategy 2025**

- Potential loss in sales
- Drop in Market Capitalization of c.US$24bn
- Other early stage legal risks

Source: Argon estimates, broker reports, press search
Global automotive industry outlook

*Growth driven by urbanization; slowed by rise of sharing economy*

**Current / future sales, millions**

Private vehicle sales in high-growth markets such as China driven by macroeconomic trends

Shared vehicle sales in mature markets like North America / EU driven by higher replacement from increased wear and tear

Source: McKinsey, Euromonitor, press search, Argon analysis
5 key levers to industry success

Understanding the end-to-end value chain of the automobile manufacturer

- R&D
- Sourcing / Manufacturing
- Branding / marketing
- Sales / distribution
- After-sales services

Superior innovation, technology, quality
Operational excellence, cost efficiencies
Strong, differentiated brand
Reach and quality of distribution network
Quality of post-purchase experience

To attain its goal of being the largest car manufacturer, VW has to manage these 5 levers effectively

Source: BCG, Argon analysis, case material
5 key levers to industry success

Understanding the end-to-end value chain of the automobile manufacturer

Before it can capitalise on the huge market potential in the mobility market, VW needs to address immediate issues with global branding and marketing.

“**I don’t think the issue is that major.** Many people are dependent on VW products and will stick with those products as they are still the best, even after the diesel scandal.”

“I will never buy another VW product... **no more VWs for me.** Why? Because this was criminal fraud in my opinion.”

Source: BCG, Argon analysis, press search, case material
5 key levers to industry success

Understanding the end-to-end value chain of the automobile manufacturer

R&D  Sourcing / Manufacturing  Branding / marketing  Sales / distribution  After-sales services

Mature markets  Emerging markets

VW needs to make a strategic decision on where to play to win

Source: BCG, Argon analysis, case material
5 key levers to industry success

Understanding the end-to-end value chain of the automobile manufacturer

R&D  |  Sourcing / Manufacturing  |  Branding / marketing  |  Sales / distribution  |  After-sales services

From cars… to mobility

Competitors cutting costs aggressively

VW needs to ride on new technologies and improve operating margins to be a world class manufacturer in 2025

Presenting Strategy 2025
Positioning VW group for success

Goal: To be the #1 car manufacturer in the world

Short Term
Rebuilding consumer trust

Medium Term
Geographic strategy

Long Term
Investing for the future

Goals
Global Presence
Increased Profitability
Leader in Innovation
Trusted Brand

Values
Reliability
Transparency
Efficiency
Innovation

Source: Argon analysis
Measuring the success of Strategy 2025

VW AG will chart its success with 3 key metrics

1. Hitting 12m in global group sales by 2025
   - 2014: 9.49
   - 2025: 12.03
   - Increase: +27%

2. Group operating margin improvement
   - 2014: 6.3%
   - 2025: 7.2%
   - Improvement: +14%

3. Increased R&D spending via CAPEX to sales ratio
   - 2014: 6.3%
   - 2025: 8.2%
   - Increase: +30%

Source: Argon estimates
Strategy 2025
Our roadmap to success

Rev
up stakeholder trust in our business

Steer
our growth in core and frontier markets

Accelerate
into the future with new technologies

How can we rebuild consumer confidence in the wake of the emissions scandal?

What geographies should VW Group focus on?

What products/technologies should VW focus on to capitalise on disruptive trends?

Source: Argon analysis
Strategy 2025
Our roadmap to success

- Rev: up stakeholder trust in our business
- Steer: our growth in core and frontier markets
- Accelerate: into the future with new technologies

How can we rebuild consumer confidence in the wake of the emissions scandal?
What geographies should VW Group focus on?
What products/technologies should VW focus on to capitalise on disruptive trends?

Source: Argon analysis
Identifying the Relevant Stakeholders

Different groups of people are affected by the emission scandal

**INTERNAL**
- Employees
- Shareholders

**EXTERNAL**
- Activists
- Dealers
- Prospective buyers
- Government Agencies
- Buyers

Source: Case material, Argon analysis
Need to bridge the gap

VW’s post-scandal reparations do not meet stakeholders’ requirements

**What Stakeholders Want**

- **Buyers**
  Comparable compensation for losses incurred

- **Shareholders**
  Accountability for the scandal

**What VW offers**

- “Customer Goodwill package”
  - $500 VW prepaid Visa card
  - $500 VW dealership card
- Sustained silence over plans for subsequent remedial action

VW needs to address the primary concerns of key stakeholders to reverse erosion in confidence

Source: Case material, Argon analysis
Prioritising key stakeholders for VW

Identifying key groups and their relationships to VW

Source: Argon analysis
Prioritising key stakeholders for VW

Identifying key groups and their relationships to VW

Influence on policy and resources

- Activists
- Govt Agencies

Interest in VW

- Prospective Buyers
- Dealers
- Shareholders

Satisfy

Engage

Monitor

Inform

- Buyers
- Employees

Source: Argon analysis
Addressing our stakeholders
A framework to guide communication to key groups

We are fully committed to the principles of transparency and honesty

“We are sorry and we promise to be better”

Source: Argon analysis
Addressing our stakeholders

A framework to guide communication to key groups

“We are committed to maintaining the quality and market leadership of VW”

“We are committed to the financial success of VW and are cooperating with authorities.”

Announcements
Direct mailers providing regular updates

Monthly dealer visits
Calls and videoconferences

Source: Argon analysis
Addressing our stakeholders
A framework to guide communication to key groups

Key Takeaway

**Tailored messages and channels** will allow us to achieve organizational and communication objectives and reinforce our new value of transparency, **setting the stage for future growth**

"We are committed to the financial success of VW and are cooperating with authorities."

"We are committed to maintaining the quality and market leadership of VW."

Source: Argon analysis
Strategy 2025
Our roadmap to success

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What geographies should VW Group focus on?

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Source: Argon analysis
Industry growth outlook by 2020

Growth in industry is expected to shift from TRIAD to BRICS

- **2015 Sales: 7.74 mil**
  - Growth rate: -1.26%

- **2015 Sales: 1.49 mil**
  - Growth rate: 7.98%

- **2015 Sales: 2.12 mil**
  - Growth rate: 6.47%

- **2015 Sales: 16.0 mil**
  - Growth rate: 3.74%

- **2015 Sales: 22.2 mil**
  - Growth rate: 5.63%

Source: Business Monitor International
VW’s key markets are in EUR and China

VW’s revenue split by region is focused on China and its home market

2015 Sales: 16.0 mil
Growth rate: 3.74%

2015 Sales: 22.2 mil
Growth rate: 5.63%

Source: Business Monitor International, Volkswagen Group
China: Key growth opportunity

China remains VW’s key growth market through to 2020

Source: Business Monitor International, Volkswagen Group
US & EUR: Short-term priority focus

Urgent attention is demanded by US & EUR due to emission scandal

Source: Business Monitor International, Volkswagen Group

VW sales by region (Feb '16)
US & EUR: Core markets

**Urgent attention must be paid as these two markets are crucial to VW**

- **2015 Sales:** 7.74 mil
  - Growth rate: -1.26%
- **2015 Sales:** 16.0 mil
  - Growth rate: 3.74%

- **VW and world’s 2nd largest automobile market in the world**
- **Heart of VW’s R&D centers**
- **3rd largest automobile market in the world**
- Key innovation hub for future technologies
- Matter of pride for VW brand

**Source:** Business Monitor International, Volkswagen Group
US & EUR: Short-term priority focus

Urgent attention is demanded by US & EUR due to emission scandal

Implication

VW cannot afford to lose the US & European markets while continuing to drive growth through business in China

Source: Business Monitor International, Volkswagen Group
## Localized strategies for key countries

**Broad-brush products / R&D will not suffice for VW in priority markets**

<table>
<thead>
<tr>
<th>Trends</th>
<th>United States</th>
<th>Europe</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Death of diesel” ↑ environmental consciousness</td>
<td>GHG-conscious Tech-integrated society</td>
<td>Slowing growth Increasing affluence</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strategy</th>
<th>United States</th>
<th>Europe</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on EV</td>
<td>R&amp;D: Diesel efficiency Ridesharing partnership</td>
<td>Emphasize premium brands</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target</th>
<th>United States</th>
<th>Europe</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmentally-focused consumers</td>
<td>Mass market</td>
<td>Increasing middle class demographic</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>United States</th>
<th>Europe</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Become competitive in EV segment</td>
<td>Extend market leadership in home markets</td>
<td>Achieve leadership in premium segment</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Argon analysis
Supporting key markets through China

Using cross-subsidization to sustain VW’s other key markets

Why cross-subsidize?

- Settle financial reparations
- Sustain key markets
- Maintain R&D economies of scale

Source: Argon analysis
Strategy 2025
Our roadmap to success

Rev
up stakeholder trust in our business

Steer
our growth in core and frontier markets

Accelerate
into the future with new technologies

What products / technologies should VW focus on to capitalise on disruptive trends?

How can we rebuild consumer confidence in the wake of the emissions scandal?

What geographies should VW Group focus on?

Source: Argon analysis
Decision on Diesel?

Diesel should still be in VW’s portfolio but with diminished focus

- Large proportion of EUR sales (53%)
- Room for R&D (achieve emission standards)
- Maintain interest but reduce focus

Source: Boston Consulting Group, Argon analysis
Double down on new growth segment

Electric Vehicles (EV) possess significant opportunity for VW

Market growth rate

- **Plug-in Hybrids**
  - Hybrids
  - CNG
  - Electric

Fuel cell
- Question mark
- Star
- Dog
- Cash cow

Market share

- No dominant player in the market (unlike PHEV)
- Most anticipated eco-solution
- Falling costs of production
- Increase R&D investment with long-term view

Source: Boston Consulting Group, Argon analysis
Streamlining costs within VW

In light of emissions scandal, VW must prioritize cost management

VW Cost Levers

- Innovation
- Operational Efficiency
- Labour workforce
- Marketing & Branding
- Sales & Administration

In light of the emissions scandal, Volkswagen must prioritize cost management. The company can achieve this through various cost levers, including innovation, operational efficiency, labor workforce, marketing and branding, and sales and administration.
Expanding productivity across VW

For greater cost management, VW needs to reassess cost structure

VW Cost Levers

Innovation R&D
Operational Efficiency
Labour workforce
Marketing & Branding
Sales & Administration

Develop cost management competency through focus on productivity

Restricted by labour union

Necessary costs due to recent emissions scandal and need to win back stakeholders

ANALYSIS REV STEER ACCELERATE CRUISE
Industry trends and outlook
2 themes define the future: disruptive trends and operational efficiency

R&D: Disruptive trends

A revolution of technology-driven trends

1. Shared Mobility
2. Electric / Efficient Mobility
3. Connected Mobility
4. Autonomous Mobility

Operational Efficiency

An evolution of transportation

1. Improvement in engine efficiency
2. Reduction in production cycles
3. Modularisation and mechanisation

Source: KPMG, BCG, McKinsey, Argon analysis
Mobility in 2025

4 technology-driven trends will shape the future of personal mobility

Source: Case material, McKinsey, Prime Research, KPMG, Argon analysis

R&D: Disruptive trends

- **Shared mobility**
- **Connected mobility**
- **Electric / efficient mobility**
- **Autonomous mobility**
- **ICE Downsizing**
- **Standardization and Modularization**

Operational Efficiency

Degree of disruption

2010  2015  2020  2025
Strategy 2025
Our roadmap to success

Rev
up stakeholder trust in our business

Steer
our growth in core and frontier markets

Accelerate
into the future with new technologies

Cruise
Charting the financial impact of Strategy 2025

How can we rebuild consumer confidence in the wake of the emissions scandal?

What geographies should VW Group focus on?

What products / technologies should VW focus on to capitalise on disruptive trends?

Source: Argon analysis

ANALYSIS
REV
STEER
ACCELERATE
CRUISE
Greater global presence around the world

*Capitalize of market growth and deliver to focus markets*

**North America**
- 2014: 0.88m
- 2016: 0.83m
- 2020: 0.85m
- 2025: 0.91m
- **CAGR:** 0.70%

**Europe**
- 2014: 3.52m
- 2016: 3.74m
- 2020: 4.11m
- 2025: 4.48m
- **CAGR:** 2.1%

**Asia Pacific**
- 2014: 4.02m
- 2016: 4.34m
- 2020: 4.83m
- 2025: 5.38m
- **CAGR:** 2.4%

**South America**
- 2014: 0.69m
- 2016: 0.74m
- 2020: 0.78m
- 2025: 0.85m
- **CAGR:** 1.4%

**Other Markets**
- 2014: 0.37m
- 2016: 0.38m
- 2020: 0.39m
- 2025: 0.41m
- **CAGR:** 0.68%

Targeted amount of global sales by 2025: **12.03m**
Increased profitability

Impact of margin improvements from manufacturing

Modularity will reduce costs as product solutions become simpler across the group

Downsizing of ICEs and reduction of product life cycles reduce waste
Leadership in Innovation

Additional R&D CAPEX to accelerate into future technologies

Increased R&D CAPEX to improve operational efficiency and technological advancements

Connectivity

Digitalization

Automation
Trusted Brand
Regain the trust of consumers in the long run

Establish trust within consumers’ mind-set on Volkswagen

To preserve
- Quality Consciousness
- Identification with productions
- Social Responsibility

To achieve
- More Openness
- More Cooperation
- More capacity for criticism

Source: Argon analysis
Strategy 2025
Positioning VW group for success

Goal: To be the #1 car manufacturer in the world

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<td>Geographic strategy</td>
<td>Investing for the future</td>
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**Goals**
- Global Presence
- Increased Profitability
- Leader in Innovation
- Trusted Brand

**Values**
- Reliability
- Transparency
- Efficiency
- Innovation
Measuring the success of Strategy 2025
VW AG will chart its success with 3 key metrics

Hitting 12m in global group sales by 2025
9.49 → 12.03
+27%

Group operating margin improvement
6.3% → 7.2%
+14%

Increased R&D spending via CAPEX to sales ratio
6.3% → 8.2%
+30%

Source: Argon estimates
Volkswagen 2025: Reliability | Transparency | Efficiency | Innovation

- Single design line inspired by aircraft fuselages and wings
- Side mirrors link up for full view in rearview mirror
- 4.0L V8 Engine At least 2 electric motors
- 12 inch touch screen infotainment system
- Complex grill with 3D printing technology
- Modular chassis saves on costs
End of Main Presentation Document

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Back-Up Slides After This Page

in conjunction with

VOLKSWAGEN

AKTIENGESellschaft
Strategy 2018 in detail

1. Volkswagen intends to deploy intelligent innovations and technologies to become a world leader in customer satisfaction and quality.

2. The goal is to increase unit sales to more than 10 million vehicles a year; in particular, Volkswagen intends to capture an above-average share of growth in the major growth markets.

3. Volkswagen’s aim is a sustainable return on sales before tax of at least 8% so as to ensure that the Group’s solid financial position and ability to act are guaranteed even in difficult market periods.

4. Volkswagen aims to become the top employer across all brands, in all companies and regions; this is necessary in order to build a first-class team.

Source: Case material
VW Group portfolio – 2014
## Business segments of VW AG

<table>
<thead>
<tr>
<th>12 automotive brands</th>
<th>Financial services</th>
</tr>
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<tbody>
<tr>
<td><img src="#" alt="Volkswagen" /></td>
<td><img src="#" alt="Volkswagen Financial Services" /></td>
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<tr>
<td><img src="#" alt="Audi" /></td>
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<tr>
<td><img src="#" alt="Škoda" /></td>
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<tr>
<td><img src="#" alt="Bentley" /></td>
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<td><img src="#" alt="Lamborghini" /></td>
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<tr>
<td><img src="#" alt="Porsche" /></td>
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<tr>
<td><img src="#" alt="Commercial Vehicles" /></td>
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<td><img src="#" alt="Bugatti" /></td>
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<td><img src="#" alt="Ducati" /></td>
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<td><img src="#" alt="Scania" /></td>
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<td><img src="#" alt="MAN" /></td>
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</tbody>
</table>
Top models (1)

Volkswagen
- Jetta/Bora
- Golf
- Lavida/Sagitar

SEAT
- Ibiza
- Leon
- Altea/Toledo

Audi
- A4
- A6
- Q5

Bentley
- Continental GT Coupé
- Flying Spur

ŠKODA
- Octavia
- Fabia
- Rapid

Porsche
- Cayenne
- 911 Coupé/Cabriolet
- Boxster/Cayman

Source: Company website
Top models (2)

Volkswagen
- Commercial Vehicles: Caravelle/Multivan, Kombi, Saveiro, Amarok

Lamborghini
- AVENTADOR

Scania
- Trucks, Buses

Bugatti
- VEYRON

MAN
- Trucks, Buses

Source: Company website
R&D footprint of VW Group

- c. 47,000 R&D employees worldwide
- In 2014/15, focus on infotainment, driver assistance, lightweight materials, electric drivetrain
**Future rollout plans**

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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<tr>
<td><strong>2ND HALF</strong></td>
<td></td>
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<tr>
<td>Volkswagen</td>
<td>e-Golf debut</td>
<td>Golf SportWagen debut</td>
<td>Passat freshen</td>
<td>CC redesign (or early 2017)</td>
<td>Jetta redesign</td>
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<tr>
<td></td>
<td></td>
<td>Golf R debut</td>
<td></td>
<td>Tiguan redesign (or early 2017)</td>
<td>Tourareg redesign</td>
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<tr>
<td></td>
<td></td>
<td>Touareg freshen</td>
<td></td>
<td>Midsize SUV debut (or early 2017)</td>
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<td><strong>1ST HALF</strong></td>
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<td><strong>2ND HALF</strong></td>
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<tr>
<td>Audi</td>
<td>A3 convertible debut</td>
<td>A3 e-tron debut</td>
<td>A4 redesign (or early 2016)</td>
<td>A4 e-tron debut</td>
<td>A5 sportback debut possible</td>
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<tr>
<td></td>
<td>S3 debut</td>
<td></td>
<td>A6 freshen</td>
<td>A4 Avant debut</td>
<td>A8 redesign</td>
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<td></td>
<td>Q3 debut</td>
<td></td>
<td>A7 freshen</td>
<td>A5 redesign</td>
<td>A8 e-tron debut</td>
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<td></td>
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<td>TT redesign</td>
<td>R8 redesign</td>
<td>Q3 redesign</td>
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<td></td>
<td></td>
<td></td>
<td>Q7 redesign</td>
<td>Q1 debut (or early 2017)</td>
<td>Q8 debut</td>
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<td><strong>1ST HALF</strong></td>
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<td><strong>2ND HALF</strong></td>
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</tr>
<tr>
<td>Porsche</td>
<td>911 GT3</td>
<td>Boxster freshen</td>
<td>Entry-level roadster debut possible</td>
<td>911 plug-in hybrid debut possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RS debut possible</td>
<td>911 freshen</td>
<td>Boxster RS Spyder debut</td>
<td>Macan plug-in hybrid debut possible</td>
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<tr>
<td></td>
<td>Cayenne freshen</td>
<td>Macan 4-cylinder debut</td>
<td>Cayman freshen</td>
<td>Cayenne redesign</td>
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<td></td>
<td></td>
<td>Macan diesel debut</td>
<td>Cayman GT4 debut</td>
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<td>Panamera redesign</td>
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<tr>
<td><strong>2018</strong></td>
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<td>Passat redesign</td>
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<td>Phaeton debut (or 2019)</td>
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*Source: Press search*
## Metrics of Strategy 2018

<table>
<thead>
<tr>
<th>Measure</th>
<th>Target</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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</thead>
<tbody>
<tr>
<td>VW Group Sales (thousands of units)</td>
<td>Over 10,000</td>
<td>6,200</td>
<td>6,300</td>
<td>6,300</td>
<td>7,200</td>
<td>8,270</td>
<td>9,300</td>
<td>9,700</td>
<td>10,200</td>
</tr>
<tr>
<td>VW Group profit (return on sales) before tax</td>
<td>Over 8.0%</td>
<td>6.0%</td>
<td>5.8%</td>
<td>1.2%</td>
<td>7.1%</td>
<td>11.9%</td>
<td>13.2%</td>
<td>6.3%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Automotive Division CAPEX to sales ratio</td>
<td>6.00%</td>
<td>4.6%</td>
<td>6.6%</td>
<td>6.2%</td>
<td>5.0%</td>
<td>5.6%</td>
<td>5.9%</td>
<td>6.3%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Automotive Division return on investment</td>
<td>Over 16%</td>
<td>9.5%</td>
<td>10.9%</td>
<td>3.8%</td>
<td>13.5%</td>
<td>17.7%</td>
<td>16.6%</td>
<td>14.5%</td>
<td>14.9%</td>
</tr>
<tr>
<td>VW Group fleet CO₂ emissions (EU 27)</td>
<td>Less than 120g/km</td>
<td>164</td>
<td>159</td>
<td>151</td>
<td>144</td>
<td>137</td>
<td>135</td>
<td>129</td>
<td>126</td>
</tr>
</tbody>
</table>

*Source: Case material*
## US emissions standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Emission Limits at 50,000 miles</th>
<th>Emission Limits at Full Useful Life (120,000 miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOx (g/mi)</td>
<td>NMOG (g/mi)</td>
</tr>
<tr>
<td>Bin 1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bin 2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bin 3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bin 4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bin 5</td>
<td>0.05</td>
<td>0.075</td>
</tr>
<tr>
<td>Bin 6</td>
<td>0.08</td>
<td>0.075</td>
</tr>
<tr>
<td>Bin 7</td>
<td>0.11</td>
<td>0.075</td>
</tr>
<tr>
<td>Bin 8</td>
<td>0.14</td>
<td>0.100 / 0.125 e</td>
</tr>
<tr>
<td>Bin 9 b</td>
<td>0.2</td>
<td>0.075 / 0.140</td>
</tr>
<tr>
<td>Bin 10 b</td>
<td>0.4</td>
<td>0.125 / 0.160</td>
</tr>
<tr>
<td>Bin 11 b</td>
<td>0.6</td>
<td>0.195</td>
</tr>
</tbody>
</table>

Source: EPA
# EU emissions standards

<table>
<thead>
<tr>
<th>Stage</th>
<th>Date</th>
<th>CO</th>
<th>HC</th>
<th>HC+NOx</th>
<th>NOx</th>
<th>PM</th>
<th>PN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compression Ignition (Diesel)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro 1†</td>
<td>1992.07</td>
<td>2.72 (3.16)</td>
<td>-</td>
<td>0.97 (1.13)</td>
<td>-</td>
<td>0.14 (0.18)</td>
<td>-</td>
</tr>
<tr>
<td>Euro 2, IDI</td>
<td>1996.01</td>
<td>1.0</td>
<td>-</td>
<td>0.7</td>
<td>-</td>
<td>0.08</td>
<td>-</td>
</tr>
<tr>
<td>Euro 2, DI</td>
<td>1996.01a</td>
<td>1.0</td>
<td>-</td>
<td>0.9</td>
<td>-</td>
<td>0.10</td>
<td>-</td>
</tr>
<tr>
<td>Euro 3</td>
<td>2000.01</td>
<td>0.64</td>
<td>-</td>
<td>0.56</td>
<td>0.50</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td>Euro 4</td>
<td>2005.01</td>
<td>0.50</td>
<td>-</td>
<td>0.30</td>
<td>0.25</td>
<td>0.025</td>
<td>-</td>
</tr>
<tr>
<td>Euro 5a</td>
<td>2009.09b</td>
<td>0.50</td>
<td>-</td>
<td>0.23</td>
<td>0.18</td>
<td>0.005f</td>
<td>-</td>
</tr>
<tr>
<td>Euro 5b</td>
<td>2011.09c</td>
<td>0.50</td>
<td>-</td>
<td>0.23</td>
<td>0.18</td>
<td>0.005f</td>
<td>6.0×10¹¹</td>
</tr>
<tr>
<td>Euro 6</td>
<td>2014.09</td>
<td>0.50</td>
<td>-</td>
<td>0.17</td>
<td>0.08</td>
<td>0.005f</td>
<td>6.0×10¹¹</td>
</tr>
<tr>
<td><strong>Positive ignition (Gasoline)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Euro 1†</td>
<td>1992.07</td>
<td>2.72 (3.16)</td>
<td>-</td>
<td>0.97 (1.13)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Euro 2</td>
<td>1996.01</td>
<td>2.2</td>
<td>-</td>
<td>0.5</td>
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<tr>
<td>Euro 3</td>
<td>2000.01</td>
<td>2.30</td>
<td>0.20</td>
<td>0.15</td>
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<tr>
<td>Euro 4</td>
<td>2005.01</td>
<td>1.0</td>
<td>0.10</td>
<td>0.08</td>
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</tr>
<tr>
<td>Euro 5</td>
<td>2009.09b</td>
<td>1.0</td>
<td>0.10d</td>
<td>0.06</td>
<td>0.005e,f</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Euro 6</td>
<td>2014.09</td>
<td>1.0</td>
<td>0.10d</td>
<td>0.06</td>
<td>0.005e,f</td>
<td>6.0×10¹¹ e,g</td>
<td></td>
</tr>
</tbody>
</table>

Source: Dieselnet.com
# China emissions standards – Gasoline

## Table 1

Emission Standards for Vehicles with Positive Ignition Engines

<table>
<thead>
<tr>
<th>Stage</th>
<th>Category</th>
<th>Class</th>
<th>CO (g/km)</th>
<th>HC (g/km)</th>
<th>NMHC (g/km)</th>
<th>NOx (g/km)</th>
<th>PM (g/km)</th>
<th>PN (#/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China 3</td>
<td>Type 1</td>
<td>I</td>
<td>2.30</td>
<td>0.20</td>
<td>-</td>
<td>0.15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>4.17</td>
<td>0.25</td>
<td>-</td>
<td>0.18</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>5.22</td>
<td>0.29</td>
<td>-</td>
<td>0.21</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>China 4</td>
<td>Type 1</td>
<td>I</td>
<td>1.00</td>
<td>0.10</td>
<td>-</td>
<td>0.08</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>1.81</td>
<td>0.13</td>
<td>-</td>
<td>0.10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>2.27</td>
<td>0.16</td>
<td>-</td>
<td>0.11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>China 5</td>
<td>Type 1</td>
<td>I</td>
<td>1.00</td>
<td>0.100</td>
<td>0.068</td>
<td>0.060</td>
<td>0.0045a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>1.81</td>
<td>0.13</td>
<td>0.068</td>
<td>0.075</td>
<td>0.0045a</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>2.27</td>
<td>0.16</td>
<td>0.068</td>
<td>0.082</td>
<td>0.0045a</td>
<td></td>
</tr>
</tbody>
</table>

*note: PM and PN values represent mass concentration.*

a - applies only to direct injection positive ignition engines

Source: Dieselnet.com
## China emissions standards – Diesel

### Table 3

<table>
<thead>
<tr>
<th>Stage</th>
<th>Category</th>
<th>Class</th>
<th>CO</th>
<th>HC+NOx</th>
<th>NOx</th>
<th>PM</th>
<th>PN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>g/km</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China 3</td>
<td>Type 1</td>
<td>I</td>
<td>0.64</td>
<td>0.56</td>
<td>0.50</td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>0.80</td>
<td>0.72</td>
<td>0.65</td>
<td>0.070</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>0.95</td>
<td>0.86</td>
<td>0.78</td>
<td>0.100</td>
<td></td>
</tr>
<tr>
<td>China 4</td>
<td>Type 1</td>
<td>I</td>
<td>0.50</td>
<td>0.30</td>
<td>0.25</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>0.63</td>
<td>0.39</td>
<td>0.33</td>
<td>0.040</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>0.74</td>
<td>0.46</td>
<td>0.39</td>
<td>0.060</td>
<td></td>
</tr>
<tr>
<td>China 5</td>
<td>Type 1</td>
<td>I</td>
<td>0.50</td>
<td>0.230</td>
<td>0.180</td>
<td>0.0045</td>
<td>$6 \times 10^{11}$</td>
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<tr>
<td></td>
<td></td>
<td>II</td>
<td>0.63</td>
<td>0.295</td>
<td>0.235</td>
<td>0.0045</td>
<td>$6 \times 10^{11}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>0.74</td>
<td>0.350</td>
<td>0.280</td>
<td>0.0045</td>
<td>$6 \times 10^{11}$</td>
</tr>
</tbody>
</table>

Source: Dieselnet.com
Environmental factors shifting
6 global trends are shaping the future of mobility

- **Environment**: Climate change and associated effects
- **Urbanisation and rising income**: 70% of the world will live in cities by 2050
- **Regulations**: CO₂ and NOₓ emission regulations becoming more stringent
- **Economics**: Oil supply shocks, prices, scarcity of natural resources
- **Culture**: Changing consumer mobility preference
- **Customer expectations**: Customers prefer more innovation

Source: Volkswagen, BMW, BCG, Argon analysis
### Alternative fuel vehicles: pros and cons (1)

<table>
<thead>
<tr>
<th>Hybrids</th>
<th>Plug-in Hybrids</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)</td>
<td>(-)</td>
</tr>
<tr>
<td>• Potential for excellent fuel economy</td>
<td>• Home recharging infrastructure is available</td>
</tr>
<tr>
<td>• Run on existing gasoline supplies</td>
<td>• Gas engine can extend range for long trips</td>
</tr>
<tr>
<td>• Drive like regular cars, requiring no change in lifestyle habits</td>
<td>• Cheaper cost per mile</td>
</tr>
<tr>
<td>• Cost</td>
<td>• No vehicle emissions when running in electric mode</td>
</tr>
<tr>
<td>• Less savings than expected</td>
<td>• Daytime recharging could strain electric grid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery Electric Vehicles (BEV)</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)</td>
<td>(+)</td>
</tr>
<tr>
<td>• Quiet running</td>
<td>• Thirty-percent better fuel economy than an equivalent gasoline vehicle</td>
</tr>
<tr>
<td>• Instant torque from electric motor</td>
<td>• Widely available</td>
</tr>
<tr>
<td>• No emissions from the car</td>
<td>• Lower cost premium than for hybrid vehicles</td>
</tr>
<tr>
<td>• Low cost per mile is a fraction of that for a gasoline-powered car</td>
<td>• High torque for given displacement</td>
</tr>
<tr>
<td>• Widespread electric infrastructure</td>
<td>• Diesel car can run on a blend of renewable biodiesel fuel</td>
</tr>
<tr>
<td>• Renewable electricity sources may be used</td>
<td>• More engine noise and vibration</td>
</tr>
<tr>
<td></td>
<td>• Additional emissions equipment drives up vehicle prices</td>
</tr>
<tr>
<td></td>
<td>• Higher cost of diesel fuel</td>
</tr>
<tr>
<td></td>
<td>• Most clean diesels require refills of urea solution</td>
</tr>
<tr>
<td></td>
<td>• Manufacturers won't warranty biodiesel blends of more than 5 percent biodiesel</td>
</tr>
<tr>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>• Long recharging times</td>
<td>• More engine noise and vibration</td>
</tr>
<tr>
<td>• Limited range</td>
<td>• Additional emissions equipment drives up vehicle prices</td>
</tr>
<tr>
<td>• Expensive batteries</td>
<td>• Higher cost of diesel fuel</td>
</tr>
<tr>
<td>• Electricity production in much of the country uses coal</td>
<td>• Most clean diesels require refills of urea solution</td>
</tr>
<tr>
<td>• High-voltage home chargers can be expensive</td>
<td>• Manufacturers won't warranty biodiesel blends of more than 5 percent biodiesel</td>
</tr>
<tr>
<td>• Public chargers scarce</td>
<td>• High engine noise and vibration</td>
</tr>
</tbody>
</table>

Source: Consumerreports.org
## Alternative fuel vehicles: pros and cons (2)

### Biodiesel

<table>
<thead>
<tr>
<th>(+)</th>
<th>(-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable</td>
<td>Using vegetable oil requires a costly conversion</td>
</tr>
<tr>
<td>Fairly widely available</td>
<td>Quality of biodiesel varies widely</td>
</tr>
<tr>
<td>Older diesel cars can seamlessly burn biodiesel or diesel</td>
<td>Biodiesel costs more than petroleum diesel.</td>
</tr>
<tr>
<td>Used vegetable oil can sometimes be free.</td>
<td>So far, supply issues have prevented biodiesel supply from becoming widespread.</td>
</tr>
</tbody>
</table>

### Ethanol

<table>
<thead>
<tr>
<th>(+)</th>
<th>(-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduces demand for foreign oil</td>
<td>25% lower fuel economy on E85 than gasoline</td>
</tr>
<tr>
<td>Low emissions, high octane, and can be produced from waste materials</td>
<td>Less than 1 percent of U.S. gas stations carry E85</td>
</tr>
<tr>
<td>Existing cars can use 10-percent blends (called E10), and more than 8 million cars already on the road can use E85</td>
<td>Ethanol made from any food crop can adversely affect food prices.</td>
</tr>
</tbody>
</table>

### Compressed Natural Gas

<table>
<thead>
<tr>
<th>(+)</th>
<th>(-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs much less than gasoline, burns much cleaner, and provides comparable power</td>
<td>Huge gas tanks reduce trunk space and carry the equivalent of only a few gallons of gasoline</td>
</tr>
<tr>
<td>It is an abundant natural resource in the United States.</td>
<td>CNG provides limited range</td>
</tr>
<tr>
<td></td>
<td>Few places for consumers to refuel in most of the country</td>
</tr>
<tr>
<td></td>
<td>Refuelling is relatively slow</td>
</tr>
</tbody>
</table>

### Hydrogen Fuel Cells

<table>
<thead>
<tr>
<th>(+)</th>
<th>(-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No vehicle emissions other than water vapor</td>
<td>Expensive</td>
</tr>
<tr>
<td>Fuel economy equivalent to about twice that of gasoline vehicles</td>
<td>Requires extremely-high-pressure, on-board hydrogen storage</td>
</tr>
<tr>
<td>Hydrogen is abundant, and can be made from renewable energy</td>
<td>Few places to refuel</td>
</tr>
<tr>
<td></td>
<td>Hydrogen is very expensive to transport and there is no infrastructure in place yet</td>
</tr>
<tr>
<td></td>
<td>Currently made from non-renewable natural gas in a process that creates enormous CO2 emissions.</td>
</tr>
</tbody>
</table>

Source: Consumerreports.org
Why is after-sales service not a priority lever?

1. Not a lever to profit in the short term given the established global dealership / parts supply network.

2. High competition in fragmented market with independent retail shops with limited profit upside.

3. Will become a priority in mid to long term when refitting cars with improved connective mobility software or other telemetrics.

Source: BCG
### After-sales service market trends

#### Trends in after sales market

<table>
<thead>
<tr>
<th>Increasing competition</th>
<th>European law &amp; regulations</th>
<th>Customer requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive growth of independent fast fitters</td>
<td>CO₂ emission standards</td>
<td>Differentiation of customer segments with specific requirements</td>
</tr>
<tr>
<td>New players offering “low price parts”</td>
<td>Repair clause</td>
<td></td>
</tr>
<tr>
<td>Internet as a sales channel will gain higher importance</td>
<td>Block exemption</td>
<td></td>
</tr>
<tr>
<td>Growth of OES workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second brand workshops by OEM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### New cooperation models

- Automobile associations
- Insurance preference for repairers

#### Structural changes

- Stagnating new car sales volumes in triad markets
- More and more cars in later lifecycles

#### Source

Arthur D. Little, Argon analysis
### Volkswagen Group after-sales services provided

<table>
<thead>
<tr>
<th>Maintenance / servicing</th>
<th>Parts replacement</th>
<th>Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>Genuine parts and accessories</td>
<td>Warranty</td>
</tr>
<tr>
<td>Air conditioning refresh</td>
<td>Genuine exchange parts</td>
<td>24-hour roadside assistance</td>
</tr>
<tr>
<td>Battery replacement</td>
<td>Genuine accessories and merchandise</td>
<td>Dialogue Reception</td>
</tr>
<tr>
<td>Brake fluid change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake pads and discs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulb replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambelt change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant velocity boot replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four-wheel alignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrol engine spark plug replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock absorber replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyre replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiper blade replacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LTA pre-check</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-travel inspection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Volkswagen Singapore
How non-traditional players win in the after-sales service network

Difficult for VW to break into market immediately – need to establish sustained competitive advantage vs. non-traditional players

Source: BCG
How can VW win in the after-sales service market?

1. Craft new service offerings for older cars

2. Package financing options and after-sales service support to increase cross-selling

3. Leverage on ability to provide proprietary technology upgrades available in future that is not available to non-traditional players

Source: BCG
Factors influencing after-sales service markets in Europe

Source: BCG
Case study: Car manufacturers cutting costs aggressively

<table>
<thead>
<tr>
<th>OEM</th>
<th>Scope and impact</th>
</tr>
</thead>
</table>
| VW           | > Reduce cost by ~EUR 7 bn, of which 5 bn in Volkswagen brand until 2018  
               | > 1/3 by fixed cost reduction, 1/4 by sales and ~1/4 by R&D, and others  
               | > Fewer models and additional product offers |
| BMW          | > Reduce costs by several hundred million euros annually until 2020  
               | > Reduce R&D budgets, flexibilize production  
               | > Particular focus on Mini and 1 series |
| Daimler      | > Realign global production to reduce operating costs by 5-6% annually (in addition to already existing cost saving programs)  
               | > Increased standardization, job shifts, reduced vertical integration and investment |
| PSA          | > "Back in the race" turnaround plan, targeting lower production cost by EUR 1,100 per vehicle by 2018 – additional measures already announced  
               | > Comprehensive set of measures, including reduced number of models, upgraded auto plants, boosted market share in growing markets, reduced jobs and lowered labor costs |
| Renault-Nissan | > Raised the goal for combined alliance savings by 7.5 percent, accelerating cooperation efforts (save "at least" USD 5.8 bn by 2016)  
               | > Stepped up joint projects in development, manufacturing, purchasing and human resources |

Source: Roland Berger, Lazard
# Diesel vs Gasoline powered combustion engines

<table>
<thead>
<tr>
<th></th>
<th>Diesel</th>
<th>Gasoline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>More expensive, costs about $700 more than the same model that runs on Gasoline</td>
<td>More affordable</td>
</tr>
<tr>
<td><strong>Mileage</strong></td>
<td>Better mileage due to fuel economy, a gallon of diesel has 30% more energy than a gallon of gas</td>
<td>Lower mileage</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td>More torque which allows for terrific acceleration</td>
<td>More powerful due to greater horsepower</td>
</tr>
<tr>
<td><strong>Environmental Friendliness</strong></td>
<td>Lower carbon dioxide emissions</td>
<td>Less environmentally friendly</td>
</tr>
</tbody>
</table>
Market Share of Automakers (US)

Auto Manufacturer Market Share In America
February 2016

Source: Press search
Market Share of Automakers (China)

- Volkswagen AG (Germany) 16%
- Toyota Motor Corporation (Japan) 12%
- Daimler AG (Germany) 9%
- General Motors Company, LLC (U.S.) 9%
- Ford Motor Company (U.S.) 9%
- Nissan Motor Corporation (Japan) 7%
- Fiat S.p.A (Italy) 7%
- Bayerische Motoren Werke AG (Germany) 6%
- Others 25%

Value $1.7tr (2013)

Source: Press search
Overview of 4 technological trends driving disruption in the car industry

Shared Mobility
- E-hailing
- Car sharing

Electric / Efficiency Mobility
- Electric vehicles
- Alternative fuel vehicles

Autonomous Mobility
- Self-driving cars
- Partially autonomous cars

Future Trends

Source: Prime Research, McKinsey, Argon analysis
Tech highlights – Shared mobility

Uber | The new game changer paving the way for shared mobility

Uber even announced to develop self-driving cars.

**UBER-Facts:**
- Worth 62.5b USD
- 1/10 of Apple’s value
- Active in > 50 countries; 400 cities
- China: Ø > 1m rides daily
- 2015: > 10b USD in global bookings

New competition:
Uber competitors Lyft (United States), Didi Kuaidi (China), Ola Cabs (India), and GrabTaxi (South-East Asia) (all of which have Softbank as an investor) announce a global technology and service alliance. With the exception of Lyft (which is the runner-up to Uber in the United States), all the other companies in the partnership are market leaders in their respective regions of focus.

Source: Prime Research
Tech highlights – Connected mobility

Smartphone integration

Audio features (e.g. Bluetooth audio streaming, webradio, satellite radio, USB-audio interface)
Navigation system (e.g. also for safety interaction with predictive route-data, etc.)
Web access (e.g. apps, web-based traffic information and infotainment, access to search engines)
Virtual cockpit / user-programmable instrument cluster (e.g. Audi TT)
Head-up display
Voice control
Personalisation through learning algorithms and context awareness
Communication features (e.g. e-mail functionality, communication apps)
Touchpad / touchwheel
Operator services (e.g. for reservations, bookings, remote vehicle diagnostics)
Converging of Connected Car and Smart Home
Gesture control (e.g. recognition of ‘swiping’ or ‘pointing’)
Wearables (e.g. smart watch connected to car)

Source: Prime Research
Tech highlights – Electric / Efficient mobility

Source: Prime Research
Tech highlights – Autonomous mobility

Expert views by 2020

- **Subcompact Cars**
  - *e.g.* smart fortwo, Fiat 500

- **Compact Cars**
  - *e.g.* Ford Focus, VW Golf, Toyota Corolla

- **Mid-size cars**
  - *e.g.* BMW 3-series, VW Passat

- **Full-size cars**
  - *e.g.* MB E-Class, Audi A6

- **Full-size luxury cars**
  - *e.g.* MB S-Class, Lexus LS

- **Sports cars & convertibles**
  - *e.g.* Jaguar F-Type, Porsche 911

Source: Prime Research
5 levers to industry success: best practices

<table>
<thead>
<tr>
<th>R&amp;D</th>
<th>Sourcing / Manufacturing</th>
<th>Branding / marketing</th>
<th>Sales / distribution</th>
<th>After-sales services</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Innovative new functions</td>
<td>• Localised manufacturing • Automated manufacturing</td>
<td>• Strong, differentiated brand</td>
<td>• Reach and quality of distribution network</td>
<td>• Engaged customers • Loyalty program</td>
</tr>
</tbody>
</table>

Source: BCG, Argon analysis
Changing competitive landscape of the mobility industry

Increasing complexity of the competitive landscape for individual mobility will force OEMs to compete on multiple fronts

Past: OEMs compete with one another

2030: OEMs compete in a complex market landscape

Source: McKinsey
How the value chains of traditional and new mobility players differ

New entrants are more focused in their product portfolio and activities along the value chain, increasing the competitive pressure on established OEMs.

Can partner with players to share competencies

Source: McKinsey
Cars affected

HOW FAR OVER THE LIMIT WERE THE CARS?
When road tested some cars were over 40 times the allowed level of nitrogen oxides.

US limit 0.04 grams/km

- 15 times
- 25 times
- 37 times
- 38 times
- 17 times
- 9 times
- 17 times

CARS KNOWN TO HAVE DEFEAT SOFTWARE INSTALLED
The list of affected cars keeps growing but here are some models most likely to have been affected.

- Audi A3 2009 - 2015
- Beetle 2009 - 2015
- Golf 2014 - 2015
- Passat 2014 - 2015
- Jetta 2009 - 2015

HOW MANY CARS WERE AFFECTED?
Approximately 11 million cars have been fitted with the software (approximately 1.1% of all cars in the world).

Volkswagen Vehicles 5 min
Audi 21 min
Seat 18 min
VW Commercial Vehicles 12 min

AFFECTED VEHICLES SOLD BY COUNTRY

Germany 2.8 min
Britain 1.2 min
France 950,000
Spain 700,000
USA 500,000

Source: Valuewalk.com
Revenue and operating profits by brand

Premium plus performance equals profit
Volkswagen Group, by brand, 2014, % of total

Source: Company reports

Source: Economist
How automotive players should align their strategic priorities

Prepare for uncertainty
- Pay close attention to the changing demographics in key markets
- Sophisticated level of scenario planning and agility is required to identify and scale new, attractive business models

Adapt the organization
- Adapt their organizations to facilitate greater internal collaboration

Leverage partnerships
- Collaborative efforts beyond the industry
- Need to maintain control over their individual value creation

Reshape the value proposition
- Strengthen B2B sales and large-scale aftermarket services for shared driving
- Evolving their value proposition from “hardware provider” to “integrated mobility service provider.”

Source: McKinsey
How to adapt HR processes to prepare for Strategy 2025?

EXHIBIT 3 | Companies Climb the Quality Curve in Four Stages

- **Beginner**
  - Setting the cultural requirements and achieving first wins
  - Create and increase quality consciousness
  - Achieve first wins and set basis for effective operational improvements

- **Advanced**
  - Operational improvements
    - Implementation of operational basics
    - Further increase in quality culture
  - Ensure consistency of processes and achieve quantum leap in quality improvement

- **Champion**
  - Winning through quality
    - Optimization of operational processes
    - Robust cross-functional feedback loops

- **Best practice**
  - Achieve full quality potential across the entire organization

**Source:** Laboratory for Machine Tools and Production Engineering, RWTH Aachen University, and BCG analysis.

- Driving home corporate culture
- Standardize processes
- Quality processes and centers of learning

*Source: BCG*
What does VW AG stand for?

Mission

VW AG doesn’t have an official mission statement. The closest statement that could be called VW Group’s mission is expressed as company’s goal: “The Group’s goal is to offer attractive, safe and environmentally sound vehicles which can compete in an increasingly tough market and set world standards in their respective class.”

Value Proposition

Each brand has its own character and operates as an independent entity on the market. The product spectrum ranges from motorcycles to low-consumption small cars and luxury vehicles.

Source: http://www.volkswagenag.com/content/vwcorp/content/en/the_group/strategy.html
What does VW stand for?

“At Volkswagen it is our mission to build long term strategic partnerships with our customers. To assist them in making the right choices for their business needs, by minimising fleet costs and providing world class customer service.”

---

**Positioning Statement:**

*For the cost conscience buyer, Volkswagen offers reliability and value.*

**Value Proposition:**

- Target Market: Cost conscience buyer (parents, females, young adults)
- Benefits offered: German technology
- Relative price: Affordable, reliable

---

Source: http://www.volkswagenag.com/content/vwcorp/content/en/the_group/strategy.html
What does Audi stand for?

Vision

“Develop Audi into the world’s leading brand in the premium automobile segment” was anchored as the vision in Strategy 2020, which was first presented in 2010.

Mission

Develop four strategic areas of activity for the Audi brand:
- We define innovation
- We create experiences
- We shape Audi
- We live responsibility

To reflect steadily changing economic, ecological and social requirements and parameters, we develop and refine the content of our strategy on a continuous basis. However, our strategic areas of activity, which are focused on long-term, sustainable corporate success, also remained unchanged in 2015.

What does Lamborghini stand for?

**THE VISION**

The Group’s vision is to bring the passion and spirit of Italy to the global market with unique and distinctive products inspired by the world of Italian Arts & Industrial Design.

Lamborghini is “the ultimate sports car”. The brand stands for extreme and uncompromising super sports cars with a distinctive Italian design.

Source: http://www.lamborghini.it/au_en/company
What does Porsche stand for?

In the beginning, I looked around and could not find the car I’d been dreaming of: a small, lightweight sports car that uses energy efficiently. So I decided to build it myself.

Ferry Porsche

Source: http://www.porsche.com/usa/aboutporsche/principleporsche/
## Risk and Mitigation – Rev

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
<th>Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Continued backlash from consumers</td>
<td>Reaffirm commitment to transparency and communicate apologies to consumers, working to provide further reimbursements</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Culture still not changed sufficiently</td>
<td>Communicate VW’s value proposition of being “about the people” through further channels and work with line managers</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Issues with dealer networks</td>
<td>Management and salesforce to meet dealers to manage relationships</td>
</tr>
</tbody>
</table>

*Source: Apollo analysis*
Stakeholder management process

1. Identify Stakeholders, Document needs
2. Define Stakeholder Management Action plans
3. Execute, Monitor & Control Action Plans
4. Analyze Stakeholders

Back-up slide
What is VW doing to manage stakeholders?

**Engage**
- BUYERS
  - “Goodwill Package”
  - 6.7bil to cover repairs
  - Cover additional taxes

**Satisfy**
- GOVT AGENCIES
  - Meetings with officials
  - Openly reported falsifying emissions from 11mil vehicles

**Inform**
- DEALERS
  - Financial reimbursement
  - Guaranteed payouts for vehicles sold

**Monitor**
- PROSPECTIVE BUYERS
  - Statement expressing regret for abuse of trust

**Employee**
- Neglected
- Threat of being persecuted for involvement in scandal

**Activists**
- No official response

**Shareholders**
- CEO stepped down as decided by core shareholders

*Source: Argon analysis*
What more can VW do to manage stakeholders?

**Engage**
- **BUYERS**
  - “Goodwill Package”
  - 6.7bil to cover repairs
  - Cover additional taxes
  - Revise marketing collateral
  - Make up for loss in performance

- **EMployees**
  - Neglected
  - Threat of being persecuted for involvement in scandal
  - Drive transparency through organization

**Satisfy**
- **GOVT AGENCIES**
  - Meetings with officials
  - Openly reported falsifying emissions from 11mil vehicles

- **ACTIVISTS**
  - No official response
  - Be accountable
  - Work together to drive ethical business practices for the industry

**Inform**
- **DEALERS**
  - Financial reimbursement
  - Guaranteed payouts for vehicles sold
  - Provide assurance on future collaborations

- **SHAREHOLDERS**
  - CEO stepped down as decided by core shareholders

**Monitor**
- **PROSPECTIVE BUYERS**
  - Statement expressing regret for abuse of trust
  - Mueller has to come clean and humbly step up to take responsibility

Source: Argon analysis
## Rationale for stakeholder positioning on stakeholder positioning map

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>Rationale for positioning</th>
</tr>
</thead>
</table>
| **BUYERS**        | - High interest in company as that has a direct impact on the price of the car a buyer will purchase  
                   - Resources allocated to best meet buyer demand |
| **GOVT AGENCIES** | - Low interest in VW per se, more concerned about its impact on the country and its people  
                   - Government policies influence how organization is shaped |
| **DEALERS**       | - Moderate interest in VW because company impacts how well sales (both trade in and resale will be) will be  
                   - Not a key consideration in internal decision making |
| **PROSPECTIVE BUYERS** | - Low interest and influence in VW, only at awareness stage of brand health pyramid |
| **EMPLOYEES**     | - High interest in VW as company incidents directly impact their livelihood  
                   - Relatively less control or influence over policies and resources |
| **ACTIVISTS**     | - Low interest in VW due to greater interest in seeing unethical business practices be resolved  
                   - Part of “prospective customers” that within VW’s consideration set of consumers |
| **SHAREHOLDERS** | - Vested interest in VW due to money invested  
                   - Not involved in managing company hence minimal influence over policies and resources |

*Source: Argon analysis*
Why not Satisfy or Monitor?

**PHASE 1**
- Suitable for short term prioritization
- Stakeholders care more about company which is crucial to make the turnaround it needs

**PHASE 2**
- Moving forward after Phase 1
- Stakeholders are less attached to the brand per se and are more concerned about the industry as a whole
- VW can look to such sustainability/environmentally conversations again

Source: Argon analysis
Addressing our stakeholders – Satisfy

"This is not what VW stands for and we will work to regain your trust."

"We are doing all we can to remedy the problem and will cooperate fully."

Satisfy

Activists

Government agencies

Meeting

Email correspondence

Press releases

Online videos

Key Message

Communication Channel

Source: Argon analysis
Addressing our stakeholders – Monitor

Monitor

Stakeholder

Key Message

“*We remain committed to providing you a reliable, safe and sustainable driving experience.*”

Communication Channel

Press releases
Online videos

Source: Argon analysis
Understanding how the values will be surfaced to key stakeholders

**WHY**
- **Buyers**: Revenue driver and means for sustainability
- **Employees**: Core of the company, directly impacted by its actions
- **Dealers**: A good working relationship is important for remaining brands
- **Shareholders**: Deserve to understand massive losses suffered

**Assurance**
- **Buyers**: Shift advertising focus to innovation & reliability
- **Employees**: Emphasis on Ombudsman program (video, pictures)
- **Dealers**: Provide quality assurance
- **Shareholders**: Assure shareholders of investigations

**Transparency**
- **Buyers**: Pledge to cover differences in residual value
- **Employees**: Establish secure, anonymous communication channels to senior management
- **Dealers**: Only roll out vehicles that pass new 2017 emissions tests
- **Shareholders**: Updates on investigations at regular intervals

Source: Argon analysis
What new advertising will there be?

- Collateral showcasing the 4 new values that Strategy 2025 will be built upon

- Shifts focus away from being “clean diesel” which would definitely garner backlash

- Shift TOM brand associations away from the emissions scandal

Source: Argon analysis
Why provide coverage for drop in residual value?

Post Emissions Scandal

Cars like the VW Golf (4-door) dropped $3000 in resale value. Customers care more about this significant loss rather than have a $500 gift card for shopping at dealerships/in general.

Improve relationships with dealers because if resale prices were the same as before, people would still want to trade in their cars and dealers earn from this.

Diesel run car 13%

Gas run car 2%
How to raise awareness of Ombudsman?

“SHARING IS CARING”

• Allow employees to drop the head of internal audit a digitized internal memo to raise queries on integrity/ethics on business practices

• Highlight procedure during employees’ vocational training and let them know they all have a part to play in making VW a good company

• Increases transparency of organization as a whole with secure channels for people to speak freely

Source: Argon analysis, press search, case studies
## Risk and Mitigation – Steer

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
<th>Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Backlash from US becomes untenable</td>
<td>Reaffirm responsibility, accountability &amp; commitment to transparency through interaction with government and media</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>US strategy does not take off</td>
<td>Conduct thorough analysis of EV landscape and identify key consumer trends to create new products</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Diesel segment collapses in EUR</td>
<td>Buffer against exodus of customers by leveraging key advantages of non diesel offerings (EV)</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Premium brands (Porsche) fail to earn Chinese consumers’ mindshare</td>
<td>Leverage on association with VW group to promote values of premium engineering and exemplary performance</td>
</tr>
</tbody>
</table>

*Source: Apollo analysis*
Why do we need to focus on Europe?

1. Home market with high customer loyalty despite scandal

2. Need to reassure consumers and regain trust

3. Provides base for focused growth

Source: Argon analysis
Why not exit US / why continue in US?

1. Prominent market with high visibility, need to remain there to be a truly global brand

2. Remains a large market that VW Group can make further inroads into

3. Reap returns in future from proximity to technological disruption – tech companies such as Lyft and Uber are most present in US

Source: Argon analysis
Why not focus on expansion in Asia alone?

1. Asia is a fast growing frontier market, but need to also defend core.

2. Would be detrimental to VW Group’s global ambition to focus on Asia at the expense of other mature regions.

Source: Argon analysis
## Detailed geographical split by brand

<table>
<thead>
<tr>
<th>Region</th>
<th>VW (P)</th>
<th>VW (C)</th>
<th>Audi</th>
<th>Bentley</th>
<th>Bugatti</th>
<th>Lambo</th>
<th>Porsche</th>
<th>Man</th>
<th>Scania</th>
<th>Ducati</th>
<th>Seat</th>
<th>Skoda</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>9.6</td>
<td>1.3</td>
<td>12.6</td>
<td>28.8</td>
<td></td>
<td></td>
<td>27.9</td>
<td>1.2</td>
<td>1.1</td>
<td>5.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>10.8</td>
<td>9.2</td>
<td>1.3</td>
<td>0.1</td>
<td></td>
<td></td>
<td>1.5</td>
<td>38.3</td>
<td>22.3</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>APAC</td>
<td>48.6</td>
<td>5.1</td>
<td>39.1</td>
<td>33.5</td>
<td></td>
<td></td>
<td>33.3</td>
<td>4.4</td>
<td>8.9</td>
<td>0</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>Europe and others</td>
<td>31</td>
<td>84.4</td>
<td>47</td>
<td>37.6</td>
<td></td>
<td></td>
<td>37.3</td>
<td>56.1</td>
<td>67.7</td>
<td>94.4</td>
<td>70.6</td>
<td></td>
</tr>
</tbody>
</table>

Source: Company filings
What is cross-subsidisation?

1. Financial reparations incurred in a region to be offset by growth from another region.

2. Key to manage potential cash flow problems from lawsuits.

Source: Argon analysis
Sub-brands positioning – Volkswagen Passenger

5.9 million

Vehicles produced

The “Volkswagen – Das Auto” slogan unites the three core messages that distinguish the Volkswagen Passenger Cars brand: innovative, offering enduring value and responsible.

The Volkswagen Passenger Cars brand premiered a large number of new vehicles in 2013. At the beginning of 2013, the brand unveiled the XL1, the most economical series automobile in the world.

The brand also presented the Golf estate and the sporty Golf GTI and Golf GTD models. The e-up!, the Volkswagen Group’s first pure-play electric drive vehicle, made its debut at the IAA in Frankfurt am Main. The pure-play electric version of the Golf was presented at the same time; production is scheduled to start at the beginning 2014.
Sub-brands positioning - Audi

1,578 thousand
Deliveries to customers in 2013

In the premium segment, Audi has become one of the strongest car brands worldwide under the slogan of “Vorsprung durch Technik”. Its objective is to become the market leader in this segment. To do this, Audi relies heavily on its sporty, high-quality and progressive image.

New production facilities further extend the brand’s competitive position in the premium segment worldwide.

In terms of products, the A3 saloon has launched Audi into the world’s fastest growing market segment: the compact saloon class.

The Audi brand also added to its range of especially sporty S and RS models with a large number of product innovations – such as the SQ5, RS 6 Avant and RS 7 Sportback models.
Sub-brands positioning - Skoda

€10.3 billion
Sales revenue in 2013

With its “Simply clever” slogan, ŠKODA has become one of the fastest emerging brands, particularly in Europe and China.

The brand image is dominated by a compelling value proposition and an attractive design, coupled with intelligent ideas for the use of space that are technically simple but offer refined and practical details. The numerous awards for its ambitious, innovative and sophisticated vehicle design are proof of the high recognition for this brand concept.

The ŠKODA brand continued the largest model rollout in its history in 2013, launching eight new models or model variants. The Rapid Spaceback is its first model in the compact hatchback segment.
Sub-brands positioning - SEAT

10.6%

Increase in deliveries

Models that regularly win awards for their outstanding design are representative of Spanish SEAT brand’s image.

SEAT is aiming for stronger growth, particularly in Europe, by sharpening its brand profile and focusing on its distinctive brand values of being dynamic, young and design-oriented. The new brand claim “Enjoyneering” suitably expresses the character of the brand as a passionate perfectionist and emotional technology leader.

The brand drove forward its model rollout in 2013 and further expanded the Leon family. The Leon ST is the brand’s first representative in the compact estate segment. The young model range helped the brand lift its sales figures.
Sub-brands positioning - Bentley

10.0%
Operating return on sales in 2013

„To build a good car, a fast car, the best in class“ – this was the mission of W.O. Bentley when he founded Bentley Motors in 1919. Still today, the definitive British luxury car company dedicates itself to developing and crafting the world’s most desirable high performance cars with the stamina to cross continents at pace, and drive in refined comfort and style. Bentley is located in Crewe, England and belongs to the Volkswagen Group since 1998.

The Bentley brand continued on its successful course in 2013 and posted a new sales record. It launched the new Flying Spur. The Continental GTC Speed Convertible celebrated its world premiere in 2013. Its top speed of 325 km/h makes it the fastest convertible in the world.
Sub-brands positioning - Porsche

911
50 years of a style icon

Porsche is an iconic sports and luxury car brand with leading profitability. High performance meets outstanding everyday practicality, breathtaking dynamics, exceptional occupant comfort and safety.

The Porsche brand can look back on a very successful 2013. Among other things, it made extensive investments to restructure and expand its plants. Porsche aims to appeal to new customers with the Macan. The brand also celebrated a special anniversary last year: 50 years of the Porsche 911.

In addition, Porsche’s next generation Panamera increased the attractiveness of the product range. Finally, the brand unveiled the limited-edition 918 Spyder super sports car, which boasts an innovative plug-in hybrid drive.
Sub-brands positioning – Volkswagen Commercial

5.0%

Increase in production in 2013

Volkswagen Commercial Vehicles stands for superior mobility with its three core values of reliability, economy and partnership. The brand offers a range of different transport solutions at the highest levels of engineering for different customer groups. The light commercial vehicles are tailored to meet the individual transportation needs of customers in retail and craft businesses, as well as civil authorities and service providers. Private customers value family-friendly MPVs and leisure-oriented motor homes.

In 2013, the brand celebrated the 9 million milestone for vehicles manufactured at the main production facility in Hanover since the plant opened in 1956. It also celebrated the 25th anniversary of the California camper. Volkswagen Commercial Vehicles marked this occasion with an attractive special edition.
Sub-brands positioning - Scania

23.8%

Increase in production

The Swedish Scania brand follows the core values of “customer first”, “respect for the individual” and “quality”. For over 100 years, this successful company has been manufacturing high-performance trucks and buses featuring extremely innovative technology. The brand offers its customers efficient transport solutions backed by service offerings and financial services.

The Scania brand presented further product innovations in 2013 and rounded off its range of Euro 6 engines. It also unveiled other innovations such as new safety and driver assistance systems – while continuing to focus on individual customer solutions and cost efficiency. The brand presented the new Scania Streamline, a long-distance model that drives forward its ongoing efforts to reduce fuel consumption.
Sub-brands positioning - MAN

140 thousand
Commercial vehicles sold in 2013

MAN’s roots can be traced back to 1758. The core values of the MAN brand are reliability, innovation, dynamic strength and openness. These values are key success factors for MAN, one of Europe’s leading manufacturers of commercial vehicles, engines and mechanical engineering equipment. The company manufactures diesel engines, turbomachinery and special gear units, alongside trucks and buses.

MAN can look back on over 250 consecutive years of company history. For the supplier of trucks, buses, diesel engines, turbomachinery and special gear units, 2013 was dominated by the product changeover to the new Euro 6 emission standard in force in Europe since January 2014.

In addition, MAN and its NEOPLAN bus brand unveiled the entire bus portfolio with economical, high-performance Euro 6 engines.
Sub-brands positioning – Lamborghini

Lamborghini

Lamborghini stands for extreme and uncompromising super sports cars of the best Italian tradition.

Lamborghini redefined the future of its super sports cars and decided to focus more on weight reduction than on top-speed. Extensive use of carbon fibre, even at a structural level, allows Lamborghini to be at the forefront of development techniques.

The successor of the Gallardo, the new Lamborghini Huracán LP 610-4, made its global debut at the Geneva Motor Show 2014 and is currently receiving overwhelming reactions from markets and customers all over the world.

AVENTADOR
Bugatti has always been the epitome of exclusivity, luxury, elegance, style and extraordinary design, driven by a great passion for automobiles.

Unique visions, the strong legacy of legendary sports cars that date back to the year 1901, and high-precision engineering in development, construction, and manufacture distinguish this outstanding automotive brand.

Bugatti confirmed its unique position by launching the Veyron Grand Sport Vitesse, the fastest roadster of all time with a top speed of 431 km/h.
Competitive landscape - US

- General Motors Corp.: 16.7%
- Ford Motor Company: 15.7%
- Toyota Motor Sales USA Inc.: 13.9%
- Chrysler LLC: 13.3%
- Nissan North America: 9.8%
- American Honda Motor Co Inc.: 8.8%
- Hyundai Motor America: 4.2%
- Kia Motors America Inc.: 3.6%
- Subaru of America Inc.: 3.2%
- Mercedes-Benz: 2%
- BMW of North America: 1.7%
- Volkswagen of America Inc.: 1.7%
- Mazda Motor of America: 1.6%

Source: Press search
Competitive landscape - China

Figure 2. Although Volkswagen remains the dominant market leader, Chery, Geely, SAIC, FAW, BAIC, Toyota and Honda are all strongly catching up.

Source: Press search

Source: IHS Autolsight April 2013; Accenture Research Analysis
# US / Europe / China consumer trends

<table>
<thead>
<tr>
<th>US</th>
<th>EUROPE</th>
<th>CHINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper urbanization leading to a “sharing economy”</td>
<td>Cost sensitive → 40% likely to abandon vehicles with rise in cost</td>
<td>Shifting from being an individual driver to having “che you” (car buddies) through car sharing</td>
</tr>
<tr>
<td>Increased sustainability and environmental concerns</td>
<td>Care about fuel efficiency</td>
<td>From owning a car as a means of mobility to owning one for self actualization (especially Tier 1 and 2 cities)</td>
</tr>
<tr>
<td>Expect customer experience leverage technology to integrate with their connected lives</td>
<td>Desire for safety technology more than cockpit technology</td>
<td>Caring more about experience and service rather than just the product</td>
</tr>
</tbody>
</table>

Source: Deloitte
EV Global Outlook

Source: Electric Vehicle Initiative
How to win in US?

- Currently the diesel market is doomed for VW
- Need to identify new segment to remain relevant in US
  - Pulling out of US is impossible because:
    - Prominent market with high visibility
    - Need to remain to be global brand
    - Reap R&D returns in future
  - Mass-market segment is dominated by GM and Ford

Opportunity

- EV market which is growing (20.9% CAGR) and expected to boom by 2040 (35% of global car sales)
- No clear dominant player in the BEV market – opens an opportunity for VW to gain market share – while waiting for scandal to subside – when EV become popular

Source: Hybridcars.com, Bloomberg, Argon analysis
How to win in Europe?

• Diesel market is still relevant in Europe
• VW remains by far the largest European OEM
• High-level of brand equity amongst consumers
• Focus on climate change is an advantage for diesel market

Opportunity

• Ridesharing partnerships e.g. Carpooling.com (Germany; Biggest in Europe)
• Similar to GM’s partnership with Lyft in US
  • Teaming up to build a network of self-driving cars
  • Invest $500m to develop a fleet of autonomous vehicles that can be summoned on demand
  • In the meantime, GM will develop national hubs where Lyft drivers can rent and operate cars without owning them

Source: WIRED
Why not India?

• Since entry in 2010, VW has only captured 4% market share

• Face immense competition from local brands (Maruti Suzuki) and foreign competitors Hyundai and Honda → Control 70% of market overall

• Predominance of entry-level compacts due to lower relative income of the Indian consumer → Contrary to VW’s relatively premium branding in the country

Opportunity

• Follow the premium model used in China to capture the relatively smaller but affluent upper-middle class market in India

• Establish production and manufacturing presence in the country to benefit from cheaper cost considerations
How is Volkswagen winning in China?

Volkswagen has carved out a niche in the volume segment with its reputation for safety and reliability.

Brands need to continually upgrade sales and ownership experiences.

Manage brand migration: Audi is the default upgrade of choice and is the government’s sedan of choice, leading to strong awareness.

Tailor brand portfolio well to meet needs of different Chinese consumer segments; adapt models to local conditions.

Source: BCG
How to win in other markets?

In all markets, providing a tailored package to meet consumer tastes and localising manufacturing to achieve optimal costs is key.
What other markets are present?

Crucial markets that VW should sustain in due to their growth potentials, with key focus still in US, Europe and China.

**Brazil**
- **Market Size:** 2.1m sales in 2014
- **Market Growth Rate:** 6.47% CAGR till 2020

**Russia**
- **Market Size:** 1.5m sales in 2014
- **Market Growth Rate:** 7.98%

**India**
- **Market Size:** 1.97m sales in 2014
- **Market Potential:** 4m units by 2020\(^1\)

\(^1\)Suzuki Analyst Research
## Risk and Mitigation – Accelerate

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
<th>Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. “Death of Diesel”</td>
<td>Explore innovations to reduce emissions (eg. catalytic converter)</td>
<td>Surrender diesel segment and shift focus to new growth segments (EV)</td>
</tr>
<tr>
<td>2. EV is not the frontier of alternate fuel innovation</td>
<td>Conduct deep research into feasibility of new tech before diving into one option</td>
<td>Withdraw and identify new segment (eg. fuel cell)</td>
</tr>
<tr>
<td>3. VW is not competitive enough to capitalize on emerging trends vis-à-vis competitors</td>
<td>Analyze core competencies (eg. modularization) and develop new technologies as core advantages</td>
<td>Partner with public research institutes (eg. Franhhofer) to systemize innovative thinking</td>
</tr>
</tbody>
</table>

Source: Apollo analysis
Modular toolkit concept

Modularisation enables standardization with visible customization whilst maintaining the individual brand identity.

Source: Company website
Benefits of modular toolkit

- Reduced product complexity
- Lower cost per unit
- Flexibility

Source: Company website
Robust roll-out of modular toolkit

Source: Company website
Cost structure of VW vs Industry

Source: IBIS, company filings, Argon analysis
Why not look to cut labour costs?

1. A lever to profit in the short term but politically unwise given current situation

2. Hugely powerful union pressure in Germany against cutting jobs or reducing wages

3. May a priority in mid to long term when seeking additional localization into markets
Why not optimize manufacturing network and outsource?

1. Not a lever to profit in the short term given the established global dealership / parts supply network

2. Hugely powerful union pressure in Germany against outsourcing

3. May a priority in mid to long term when seeking additional localization into markets (see next slide for consideration)
### Key considerations when considering optimising manufacturing networks

<table>
<thead>
<tr>
<th>Current footprint</th>
<th>Current cost base</th>
<th>Future playground</th>
</tr>
</thead>
<tbody>
<tr>
<td>What, where and how much is produced today</td>
<td>What does the current cost structure look like?</td>
<td>What, where and how much should we produce in future?</td>
</tr>
<tr>
<td>What is the rationale of the current footprint</td>
<td>What drives manufacturing costs?</td>
<td>What will the market look like in future?</td>
</tr>
<tr>
<td>What drives manufacturing volume allocation?</td>
<td>How are cost drivers and costs related?</td>
<td>What will demand look like in the future?</td>
</tr>
<tr>
<td></td>
<td>How is country sourcing and logistics related?</td>
<td>Which disruptive trends might affect our networks?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What do customers require?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunity for change</th>
<th>Opportunity valuation</th>
<th>Making change happen</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does the ideal manufacturing network look like?</td>
<td>What will influence network scenarios?</td>
<td>How should network changes be managed and implemented?</td>
</tr>
<tr>
<td>How can we balance risk aversion and appetite for risk?</td>
<td>How will wage convergence between countries affect our manufacturing networks?</td>
<td>What is the best approach in closing or ramping up production sites?</td>
</tr>
<tr>
<td>What are core competencies and what should be outsourced?</td>
<td>How robust are costs in the face of transport costs?</td>
<td>How to manage change effectively?</td>
</tr>
<tr>
<td>What is non-negotiable?</td>
<td>Is the supply chain flexible enough?</td>
<td>How to manage talent?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How to maintain service levels?</td>
</tr>
</tbody>
</table>

Source: BCG
Volkswagen production network

Source: http://www.volkswagenag.com/

# of production sites: 119
# of dealer locations: 1018
Offshoring of auto-manufacturing causing job losses in Germany

EXHIBIT 3 | Offshoring Will Cost Germany 35,000 Auto-Supply Jobs, Including Highly Skilled Engineers

- Workforce in the auto supplier industry
- Distribution of jobs
- Planned plant closures
- Impact on R&D and manufacturing jobs in Germany

- ~290,000 total workforce in 2014
- ~250,000 operations
- ~35,000 headquarters R&D
- ~215,000 next five years

Jobs lost as a result of closure of ~15% of plants

About 35,000 employees could be affected by site consolidation and closure:
- Based on an 80-20 split, 28,000 production workers and 7,000 indirect workers (engineers, quality controllers, administrative roles, support) will potentially be affected.
- About one-quarter of these impacted positions will be in competence centers and lead plants.

Source: BCG
Case study: operational efficiency of a top tier car manufacturer

1. In addition to *benchmarking*, performing structural analyses of organizational logic and spans of control, tools like activity based optimization were used to *identify pockets of inefficiency*.

2. Findings on inefficiencies in allocation were validated through benchmarking and belief.

3. **Redesign of the operating model** included redefining the roles of the support functions by applying a clear understanding of what would *create the most value from an operations perspective*.

Source: BCG
Other future tech innovations

Source: KPMG Competence Centre Automotive
## Analysis of Alternative Fuels

<table>
<thead>
<tr>
<th>Tech</th>
<th>TOM Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plug-in Hybrids</strong></td>
<td>Chevrolet Volt (GM) – Bestseller</td>
</tr>
<tr>
<td><strong>Hybrids</strong></td>
<td>Toyota Prius – Bestseller</td>
</tr>
<tr>
<td><strong>Fuel cell</strong></td>
<td>N.A. – Unfeasible</td>
</tr>
<tr>
<td><strong>Electric</strong></td>
<td>Nissan Leaf, Tesla Roadster</td>
</tr>
</tbody>
</table>

### Chart

- **Pros**
  - Great for short commutes for many drivers
  - Cheaper cost per mile

- **Cons**
  - Big, expensive batteries
  - Gas engine + daytime recharging can up prices & strain electric grid

### Table

<table>
<thead>
<tr>
<th></th>
<th>Plug-in Hybrids</th>
<th>Hybrids</th>
<th>Fuel cell</th>
<th>Electric</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td>Great for short commutes for many drivers</td>
<td>Excellent fuel economy</td>
<td>No vehicle emissions other than water vapor</td>
<td>Quiet running</td>
<td>30% better fuel economy than gasoline vehicle</td>
</tr>
<tr>
<td></td>
<td>Cheaper cost per mile</td>
<td>Run on existing gasoline supplies</td>
<td>Fuel economy equivalent to 2x gasoline vehicles</td>
<td>No emissions from the car</td>
<td>Lower cost premium than hybrid</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Big, expensive batteries</td>
<td>Some cost more than normal cars</td>
<td>Very expensive</td>
<td>Long recharging times</td>
<td>Manufacturers won't warranty blends of more than 5% biodiesel</td>
</tr>
<tr>
<td></td>
<td>Gas engine + daytime recharging can up prices &amp; strain electric grid</td>
<td>Some don't live up to expected gas mileage</td>
<td>Few places to refuel</td>
<td>Limited range</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No infrastructure in place yet</td>
<td>No infrastructure in place yet</td>
<td>Expensive batteries</td>
<td></td>
</tr>
</tbody>
</table>

Source: KPMG, Consumer Reports
### Analysis of cost levers

<table>
<thead>
<tr>
<th>Innovation R&amp;D</th>
<th>Operational Efficiency</th>
<th>Labour workforce</th>
<th>Marketing &amp; Branding</th>
<th>Sales &amp; Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs looking at future technologies (incremental / disruptive) that may revolutionize the industry</td>
<td>Costs looking into productivity gains on the production floor</td>
<td>Investments into productivity gains or overall manpower cost</td>
<td>Costs going into creating public awareness, exposure and reputational gains for VW</td>
<td>Costs into the day-to-day running of VW, as well as B2B / B2C salesforce</td>
</tr>
</tbody>
</table>
Why not lower labour cost or outsource?

- Outsourcing of R&D is not an option for a global market leader like VW – differentiation is required to compete.
- Outsourcing or cutting back on operational costs is not an option because VW needs to ramp up its product offerings.
- Lowering labour cost is not an option due to strength of labour unions.
- Imperative that VW controls and invests in its branding following the emissions scandal.
- Extensive efforts need to be invested into regaining trusts of dealers and customers.
Why prioritize operational efficiency over new technologies?

Source: KPMG Global Automotive Executive Survey 2015
Other operational efficiency innovations

**Safety Innovation**
Innovations to enhance safety of vehicles (e.g. car-to-car proximity sensors)

**Internal Combustion Engine (ICE) Downsizing**
Smaller and more powerful engines for greater horsepower and less weight

**Standardization and Modularization**
Creation of standardized toolkits to decrease production costs

**Enhanced vehicle lifespan**
Innovations to encourage more sturdy and hardy vehicles (e.g. materials)

**Ergonomics and Comfort**
Innovations for enhanced passenger comfort (e.g. leg room etc.)

**Urban vehicle design concepts**
Innovations taking in consideration urban development (e.g. smaller parking spaces, better manoeuvrability etc.)

**Driverless technology**
Innovations where cars are intelligent enough to make decisions on driving speeds, lane changes etc.

*Source: KPMG*
## Sub-brand R&D focus

<table>
<thead>
<tr>
<th>Innovation R&amp;D</th>
<th>VW</th>
<th>Audi</th>
<th>Porsche</th>
<th>Seat</th>
<th>Skoda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared mobility</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Connected mobility</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Electric mobility</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Autonomous mobility</td>
<td>✔️</td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operational Efficiency</th>
<th>VW</th>
<th>Audi</th>
<th>Porsche</th>
<th>Seat</th>
<th>Skoda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Innovation</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>ICE Downsizing</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Modularization</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Mobility-as-a-Service</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Argon analysis*
Explaining the forecast of 2025

Volkswagen 2025: Reliability | Transparency | Efficiency | Innovation

- Side mirrors link up for full view in rearview mirror
- 12 inch touch screen infotainment system
- 4.0L V8 Engine At least 2 electric motors
- Single design line inspired by aircraft fuselages and wings
- Modular chassis saves on costs
- Complex grill with 3D printing technology

Source: Argon analysis
US Justice Department Lawsuit

1. Selling cars without EPA emissions certifications: $32,500 - $37,500
2. Selling cars with defeat devices: $32,500 - $37,500
3. Tampering with engines: $32,500 - $37,500
4. Failing to report existence of defeat devices: $2,750 – $3,750

Penalty Range based on 580,000 cars

58.1 – 67.4bn

Source: Argon analysis, press search
Cost of other litigation (Ongoing)
Additional ongoing lawsuits occurring globally

**Lawsuit from other countries**

- **Brazil**
  R$50m or US$13.56m lawsuit

- **European Union**
  Possible loan recall of 1.8bn Euro
  US$2.05bn

- **South Korea**
  1) Environmental Minister fine: US$12.2M
  2) Agency Fine: Up to US$48bn
  3) Possible customer goodwill packages

**Private Action Lawsuits**

- **Germany**
  US$3.7bn from institutional investors comprising of 278 from around the world incl. 17 German investment companies

- **Australia**
  1. US$100m law suit
  2. Possible 20,000 customer goodwill packages

US$2.055bn or US$50bn max  US$3.8bn

Source: Argon analysis, press search
“The lawsuit had been expected, and analysts believe any fine will be far below the theoretical maximum. Although U.S. authorities sued Toyota for up to $58 billion for environmental violations around the turn of the century, they agreed a settlement that cost the Japanese carmaker about $34 million.”
# Equity Impact of scandal

## Drop in Market Capitalization

<table>
<thead>
<tr>
<th>Dates</th>
<th>1 Day</th>
<th>2 Day</th>
<th>1 Week</th>
<th>2 Week</th>
<th>1 Mth</th>
<th>2 Mth</th>
<th>3 Mth</th>
<th>Now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop in Mkt Cap (bn)</td>
<td>-14</td>
<td>-26</td>
<td>-29</td>
<td>-31</td>
<td>-25</td>
<td>-22</td>
<td>-13</td>
<td>-24</td>
</tr>
</tbody>
</table>

**Volume Traded (M)**

- **Market Cap**
  - Source: Reuters

---

## Writedown

**Emission Scandal** has impacted values of cars on the market.

$391m write-down from loss of value in cars.
Cost of Debt

Diversified Financing Structure

- Equity, liabilities to affiliated companies & other: 17%
- Asset backed securitization: 30%
- Bonds, commercial paper, liabilities to FI: 38%
- Customer deposits: 15%

Breakdown of Liabilities

<table>
<thead>
<tr>
<th>Non current financial liabilities</th>
<th>Sep-15</th>
<th>Dec-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds, Commercial Paper &amp; Notes</td>
<td>59,170</td>
<td>56,639</td>
</tr>
<tr>
<td>Liabilities to banks</td>
<td>11,106</td>
<td>9,692</td>
</tr>
<tr>
<td>Deposit business</td>
<td>801</td>
<td>980</td>
</tr>
<tr>
<td>Other financial liabilities</td>
<td>1,426</td>
<td>1,105</td>
</tr>
<tr>
<td>Total</td>
<td>72,502</td>
<td>68,416</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current financial liabilities</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonds, Commercial Paper &amp; Notes</td>
<td>29,300</td>
<td>29,639</td>
</tr>
<tr>
<td>Liabilities to banks</td>
<td>12,411</td>
<td>11,109</td>
</tr>
<tr>
<td>Deposit business</td>
<td>23,499</td>
<td>24,353</td>
</tr>
<tr>
<td>Other financial liabilities</td>
<td>500</td>
<td>463</td>
</tr>
<tr>
<td>Total</td>
<td>65,710</td>
<td>65,564</td>
</tr>
</tbody>
</table>

Ratings downgrade

- Volkswagen
  - Long-term IDR downgraded to 'BBB+' from 'A'; Outlook Negative
  - Senior unsecured notes downgraded to 'BBB+' from 'A'
  - Short-term IDR downgraded to 'F2' from 'F1'

Volkswagen International Finance NV

- Senior unsecured notes downgraded to 'BBB+' from 'A'
- Subordinated notes downgraded to 'BBB-' from 'BBB+

Average increase in interest rate spread of 0.45%

Estimated Additional Cost Exposure

1) Debt exposure remains as Sept 2015: **EUR138,212 M**
2) Initial Interest rate: **1.98%**
   (average yield: interest expense / total interest)

<table>
<thead>
<tr>
<th>Assumptions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Interest Payments</td>
<td></td>
</tr>
<tr>
<td>- Additional Interest Payments: <strong>US$706.8m</strong></td>
<td></td>
</tr>
<tr>
<td>- Potential Tax Shield Benefits at 29.8% rate: <strong>US$210.6M</strong></td>
<td></td>
</tr>
<tr>
<td>- Net Cost Exposure: <strong>US$496.2</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: NYU Damodaran, Company Resources (Tax Rate, Liabilities & Interest Rate)
### Cost of recall & repurchase

<table>
<thead>
<tr>
<th>Region</th>
<th>Engine</th>
<th>Volume (M)</th>
<th>Description of technical solutions</th>
<th>Cost per car (US$)</th>
<th>Total cost (US$bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>EA189 1.2-litre</td>
<td>0.3</td>
<td>Software flash</td>
<td>55</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>EA189 1.6-litre</td>
<td>3</td>
<td>Minor hardware measures (flow transformer to be fitted)</td>
<td>110</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>EA189 2.0-litre</td>
<td>5.2</td>
<td>Software flash</td>
<td>55</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>Total Europe</td>
<td>8.5</td>
<td></td>
<td></td>
<td>0.63</td>
</tr>
<tr>
<td>US</td>
<td>EA189 2.0-litre (Gen. 1)</td>
<td>0.3</td>
<td>Buyback cars @ est. price per car of $12,000</td>
<td>12,000</td>
<td>3.60</td>
</tr>
<tr>
<td></td>
<td>EA189 2.0-litre (Gen. 2)</td>
<td>0.1</td>
<td>Minor hardware measures (flow transformer) + AdBlue dosage adjustment</td>
<td>220</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>EA288 2.0-litre (Gen. 3)</td>
<td>0.1</td>
<td>Software flash + AdBlue dosage adjustment</td>
<td>55</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>3.0-litre V6 TDI</td>
<td>0.1</td>
<td>Hardware measures (changes to catalyser?) + AdBlue dosage adjustment</td>
<td>220</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Total US</td>
<td>0.6</td>
<td></td>
<td></td>
<td>3.65</td>
</tr>
<tr>
<td>Rest of World</td>
<td>EA189 (1.6-litre &amp; 2.0-litre)</td>
<td>2</td>
<td>Minor hardware measures (flow transformer) or software flash</td>
<td>93</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Total RoW</td>
<td>2</td>
<td></td>
<td></td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Total Fix Cost</td>
<td>11.1</td>
<td></td>
<td></td>
<td>4.47</td>
</tr>
<tr>
<td>Goodwill gesture</td>
<td>Europe</td>
<td>8.5</td>
<td>€350 voucher (equivalent to major service + certificate of roadworthiness)</td>
<td>385</td>
<td>3.27</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>0.6</td>
<td>$1,000 voucher already announced by VW</td>
<td>1,000</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>RoW</td>
<td>2</td>
<td>€250 voucher</td>
<td>275</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Total goodwill gesture</td>
<td>11.1</td>
<td></td>
<td></td>
<td>4.42</td>
</tr>
<tr>
<td></td>
<td>Total remediation costs</td>
<td>11.1</td>
<td></td>
<td></td>
<td>4.42</td>
</tr>
<tr>
<td></td>
<td>Total Costs</td>
<td>11.1</td>
<td></td>
<td></td>
<td>8.89</td>
</tr>
</tbody>
</table>

**Cost of Gen 1 Buyback:** $12,000 value is average residual value of vehicles before scandal

**Feasibility of repurchase:** High mechanical requirements & possible additional costs

**Customer Goodwill:** Vouchers of varying amount for customers affected by scandal

*Source: Volkswagen Company Reports, press search, analyst reports*
Internal Company Cost

<table>
<thead>
<tr>
<th>Types</th>
<th>Cost of investigation</th>
<th>Cost of hiring &amp; training</th>
<th>Cost of talent retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details</td>
<td>c.450 deployed internally and independently to investigate scandal</td>
<td>1) Employees leaving: CEO of VW US, Michael Horn resigned effectively on March 9, 2016 – incentivize staying on in VW 2) Costs of additional new staff training if new employees are brought in</td>
<td>1) Incentives: 0.5% of annual salary (Average of 94K per year) 2) No. of employees: 588,902</td>
</tr>
<tr>
<td>Assumptions</td>
<td>1) 450 Investigators as stated in Media Release 2) Fee of $50 for 7 hours, 5 days a week</td>
<td>1) Cost of Hiring: c.$18k 2) Turnover: 10K employees over 2 year horizon</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>US$37.8M per year for 1 year</td>
<td>US$188.8M per year for 2 years</td>
<td>US$278M per year for 1 year</td>
</tr>
</tbody>
</table>

Source: Argon estimates
Dealership Cost

**Types**
- Financing Reimbursement
- Guaranteed Payout

**Details**
- Vehicles not sold will be reimbursed to dealers
- 1% MSRP For Each Vehicle
- $300 per car for 1 month (September)

**Assumptions**
- 1) 30% of total cars will not be sold
- 2) Reimbursement amount at average MSRP of US$40.2K
- 1) Number of car deals in USA: 650
- 2) Assumed number of cars per dealer: 50

**Cost**
- US$392M in year 2
- US$13.1 in year 1
- US$9.75M in year 1

*Source: Argon estimates*
Intangible cost: loss of potential sales

Loss in potential sales due to damaged trust: c.200 billion over 10 years to 2025

Assumptions made:
1) VW is able to grow at industry growth rate without emissions scandal
## VW Group Car Deliveries

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>3,519,706</td>
<td>3,651,343</td>
<td>3,738,610</td>
<td>3,827,963</td>
<td>3,919,451</td>
<td>4,013,126</td>
</tr>
<tr>
<td>Western Europe</td>
<td>2,912,905</td>
<td>3,021,848</td>
<td>3,094,070</td>
<td>3,168,018</td>
<td>3,243,734</td>
<td>3,321,259</td>
</tr>
<tr>
<td>Growth%</td>
<td>3.74%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
</tr>
<tr>
<td>Central &amp; Eastern Europe</td>
<td>606,801</td>
<td>629,495</td>
<td>644,540</td>
<td>659,945</td>
<td>675,717</td>
<td>691,867</td>
</tr>
<tr>
<td>Growth%</td>
<td>3.74%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
<td>2.39%</td>
</tr>
<tr>
<td>Other Markets</td>
<td>374,020</td>
<td>378,508</td>
<td>381,423</td>
<td>384,360</td>
<td>387,319</td>
<td>390,302</td>
</tr>
<tr>
<td>Growth%</td>
<td>1.2%</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.8%</td>
</tr>
<tr>
<td>North America</td>
<td>884,454</td>
<td>852,967</td>
<td>831,131</td>
<td>835,287</td>
<td>837,793</td>
<td>844,495</td>
</tr>
<tr>
<td>Growth%</td>
<td>-3.56%</td>
<td>-2.56%</td>
<td>0.50%</td>
<td>0.30%</td>
<td>0.30%</td>
<td>0.80%</td>
</tr>
<tr>
<td>South America</td>
<td>690,101</td>
<td>734,751</td>
<td>743,347</td>
<td>753,531</td>
<td>765,211</td>
<td>769,572</td>
</tr>
<tr>
<td>Growth%</td>
<td>6.47%</td>
<td>1.17%</td>
<td>1.37%</td>
<td>1.55%</td>
<td>0.57%</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9,490,921</td>
<td>9,848,915</td>
<td>10,039,657</td>
<td>10,263,330</td>
<td>10,492,342</td>
<td>10,723,874</td>
</tr>
</tbody>
</table>

### Growth projections:

1) Market Growth Forecast
2) Dilution in growth due to emission scandal in initial years

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>3,400,637</td>
<td>3,460,488</td>
<td>3,521,393</td>
<td>3,583,369</td>
<td>3,646,437</td>
<td>3,710,614</td>
</tr>
<tr>
<td>2022</td>
<td>708,403</td>
<td>720,871</td>
<td>733,558</td>
<td>746,469</td>
<td>759,606</td>
<td>772,976</td>
</tr>
<tr>
<td>2023</td>
<td>2.39%</td>
<td>1.76%</td>
<td>1.76%</td>
<td>1.76%</td>
<td>1.76%</td>
<td>1.76%</td>
</tr>
<tr>
<td>2024</td>
<td>854,714</td>
<td>865,825</td>
<td>879,678</td>
<td>896,392</td>
<td>904,460</td>
<td>914,590</td>
</tr>
<tr>
<td>2025</td>
<td>1.21%</td>
<td>1.30%</td>
<td>1.60%</td>
<td>1.90%</td>
<td>0.90%</td>
<td>1.12%</td>
</tr>
<tr>
<td></td>
<td>784,733</td>
<td>796,504</td>
<td>808,452</td>
<td>820,578</td>
<td>832,887</td>
<td>845,380</td>
</tr>
<tr>
<td></td>
<td>1.97%</td>
<td>1.50%</td>
<td>1.50%</td>
<td>1.50%</td>
<td>1.50%</td>
<td>1.50%</td>
</tr>
<tr>
<td></td>
<td>4,833,719</td>
<td>4,938,788</td>
<td>5,046,250</td>
<td>5,156,160</td>
<td>5,268,575</td>
<td>5,383,551</td>
</tr>
</tbody>
</table>

| Total | 10,975,513 | 11,178,142 | 11,387,371 | 11,603,398 | 11,814,796 | 12,032,359 |
VW Group Car Deliveries (Visual)

Number of Deliveries (M)

Forecasted 5 year growth rates – taper down after

Europe: 3.74%  Other Markets: 1.2%  North America: -3.56%  South America: 6.47%  APAC: China: 5.63%
Operating Margin Improvements

Cost Analysis (AR14)

1. Cost of sales incl. Manufacturing Cost
   - EUR165,934M
   - 82% of revenue

2. Distribution Cost
   - EUR20,292M
   - 10% of revenue

3. Administration Cost
   - EUR6,841M
   - 3% of revenue

Greatest improvement gains can be achieved through improving operational capabilities through manufacturing.
Cost reduction from modularization

Exhibit 1: Average cost reduction potential of modularization in special machinery engineering, as a percentage of a manufacturer’s costs

15-25% cost savings translates to c.16bn cost savings moving forward
Timeline for Strategy 2025

2016 - 2019

Phase 1: Rev

2020 - 2022

Phase 2: Steer

2023 - 2025

Phase 3: Accelerate

Rev
Rebuild consumer trust

Steer
Geographical strategy to ensure sustainable growth

Accelerate
Continually reinvest in technology to position for future

Source: Argon analysis
End of presentation deck
Main Deck Index

Analysis
- 2. Strategy 2018
- 3. Disruption of Strategy 2018
- 4. Disruption of Strategy 2018
- 5. Global automotive industry outlook
- 6. 5 key levers to industry success
- 7. 5 key levers to industry success
- 8. 5 key levers to industry success
- 9. 5 key levers to industry success
- 10. Presenting Strategy 2025
- 11. Measuring the success of Strategy 2025
- 12. Strategy 2025
- 19. Addressing our stakeholders
- 20. Addressing our stakeholders
- 35. Industry trends and outlook
- 36. Mobility in 2025

Steer
- 21. Strategy 2025
- 22. Industry growth outlook by 2020
- 23. VW’s key markets are in EUR and China
- 24. China: Key growth opportunity
- 25. US & EUR: Short-term priority focus
- 26. US & EUR: Core markets
- 27. US & EUR: Short-term priority focus
- 28. Localized strategies for key countries
- 29. Long-term revenue split by region

Cruise
- 37. Strategy 2025
- 38. Greater global presence around the world
- 39. Increased profitability
- 40. Leadership in Innovation
- 41. Trusted Brand
- 42. Strategy 2025
- 43. Measuring the success of Strategy 2025

Rev
- 13. Strategy 2025
- 14. Identifying the Relevant Stakeholders
- 15. Need to bridge the gap
- 16. Prioritising key stakeholders for VW
- 17. Prioritising key stakeholders for VW
- 18. Addressing our stakeholders

Accelerate
- 30. Strategy 2025
- 31. Decision on Diesel?
- 32. Double down on new growth segment
- 33. Streamlining costs within VW
- 34. Expanding productivity across VW
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**Analysis**

- 46. Strategy 2018 in detail
- 47. VW Group portfolio – 2014
- 48. Business segments of VW AG
- 49. Top models (1)
- 50. Top models (2)
- 51. R&D footprint of VW Group
- 52. Future rollout plans
- 53. Metrics of Strategy 2018
- 54. US emissions standards
- 55. EU emissions standards
- 56. China emissions standards – Gasoline
- 57. China emissions standards – Diesel
- 58. Environmental factors shifting
- 59. Alternative fuel vehicles: pros and cons (1)
- 60. Alternative fuel vehicles: pros and cons (2)
- 61. Why is after-sales service not a priority lever?
- 62. After-sales service market trends
- 63. Volkswagen Group after-sales services provided

- 64. How non-traditional players win in the after-sales service network
- 65. How can VW win in the after-sales service market?
- 66. Factors influencing after-sales service markets in Europe
- 67. Case study: Car manufacturers cutting costs aggressively
- 68. Diesel vs Gasoline powered combustion engines
- 69. Market Share of Automakers (US)
- 70. Market Share of Automakers (China)
- 71. Overview of 4 technological trends driving disruption in the car industry
- 72. Tech highlights – Shared mobility
- 73. Tech highlights – Connected mobility
- 74. Tech highlights – Electric / Efficient mobility
- 75. Tech highlights – Autonomous mobility
- 76. 5 levers to industry success: best practices
- 77. Changing competitive landscape of the mobility industry
- 78. How the value chains of traditional and new mobility players differ

- 79. Cars affected
- 80. Revenue and operating profits by brand
- 81. How automotive players should align their strategic priorities
- 82. How to adapt HR processes to prepare for Strategy 2025?
- 83. What does VW AG stand for?
- 84. What does VW stand for?
- 85. What does Audi stand for?
- 86. What does Lamborghini stand for?
- 87. What does Porsche stand for?
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Rev
• 88. Risk and Mitigation – Rev
• 89. Stakeholder management process
• 90. What is VW doing to manage stakeholders?
• 91. What more can VW do to manage stakeholders?
• 92. Rationale for stakeholder positioning on stakeholder positioning map
• 93. Why not Satisfy or Monitor?
• 94. Addressing our stakeholders – Satisfy
• 95. Addressing our stakeholders – Monitor
• 96. Understanding how the values will be surfaced to key stakeholders
• 97. What new advertising will there be?
• 98. Why provide coverage for drop in residual value?
• 99. How to raise awareness of Ombudsman?

Steer
• 100. Risk and Mitigation – Steer
• 101. Why do we need to focus on Europe?
• 102. Why not exit US / why continue in US?
• 103. Why not focus on expansion in Asia alone?
• 104. Detailed geographical split by brand
• 105. What is cross-subsidisation?
• 106. Sub-brands positioning – Volkswagen Passenger
• 107. Sub-brands positioning - Audi
• 108. Sub-brands positioning - Skoda
• 109. Sub-brands positioning - SEAT
• 110. Sub-brands positioning - Bentley
• 111. Sub-brands positioning - Porsche
• 112. Sub-brands positioning – Volkswagen Commercial
• 113. Sub-brands positioning - Scania
• 114. Sub-brands positioning - MAN
• 115. Sub-brands positioning – Lamborghini
• 116. Sub-brands positioning - Bugatti
• 117. Competitive landscape - US

• 118. Competitive landscape - China
• 119. US / Europe / China consumer trends
• 120. EV Global Outlook
• 121. How to win in US?
• 122. How to win in Europe?
• 123. Why not India?
• 124. How is Volkswagen winning in China?
• 125. How to win in other markets?
• 126. What other markets are present?
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- 127. Risk and Mitigation – Accelerate
- 128. Modular toolkit concept
- 129. Benefits of modular toolkit
- 130. Robust roll-out of modular toolkit
- 131. Cost structure of VW vs Industry
- 132. Why not look to cut labour costs?
- 133. Why not optimize manufacturing network and outsource?
- 134. Key considerations when considering optimising manufacturing networks
- 135. Volkswagen production network
- 136. Offshoring of auto-manufacturing causing job losses in Germany
- 137. Case study: operational efficiency of a top tier car manufacturer
- 138. Other future tech innovations
- 139. Analysis of Alternative Fuels
- 140. Analysis of cost levers
- 141. Why not lower labour cost or outsource?
- 142. Why prioritize operational efficiency over new technologies?
- 143. Other operational efficiency innovations
- 144. Sub-brand R&D focus
- 145. Explaining the forecast of 2025

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- 146. US Justice Department Lawsuit
- 147. Cost of other litigation (Ongoing)
- 148. Downplaying Impact of Litigations
- 149. Equity Impact of scandal
- 150. Cost of Debt
- 151. Cost of recall & repurchase
- 152. Internal Company Cost
- 153. Dealership Cost
- 154. Intangible cost: loss of potential sales
- 155. VW Group Car Deliveries
- 156. VW Group Car Deliveries (Visual)
- 157. Operating Margin Improvements
- 158. Cost reduction from modularization
- 159. Timeline for Strategy 2025