



LCBB6004 LEVEL6

## **Strategic Management and Sustainability**

### **ASSESSMENT 1**



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## Introduction

This report seeks to understand better Volkswagen (VW), the Automotive organisation, and its competitive environment over the last five financial years.

Moreover, this paper attempts to understand better the upregulations in emission that the Company was involved in 2015 when the US Environmental Protection Agency announced in a "Notice of Violation" that irregularities with specific nitrogen oxide emissions had been discovered in around eleven million vehicles worldwide.

The automobile industry is undergoing a revolution, and the three main themes are autonomous driving, e-mobility, and related vehicle concepts. Customer needs and business models are affected by technological advancements; new competitors are entering the market from different sectors; shorter innovation cycles and the development of new core competencies necessitate ever-increasing capital; stricter emission regulations and increased market volatility produce more complex underlying conditions. All of this presents new challenges for automakers.

## The Volkswagen Organisation and its competitive environment

Strategic management focuses on identifying and outlining the tactics managers may use to improve performance and provide their Company a competitive edge. If a company's profitability is better than the average for businesses in its industry, that Company is considered to have a competitive edge.

Strategic management can also be defined as a collection of actions and decisions made by a manager to determine the outcome of the Company's performance. Therefore, for the manager to make the right decisions, they need to comprehensively understand and analyze the competitive organizational environment as a whole.

According to the definition given in the literature study, strategic management, also known as strategy management, is the formulation and execution of initiatives aimed at achieving a broad corporate strategy. The main objective of strategic management is resource allocation, which entails developing a plan of action for how the Company will spend resources to capitalize on its competitive advantage and accomplish its objectives. In addition, making strategic decisions that fit the Company's strategy with its core strengths also requires monitoring the effectiveness of an organization's strategy over time.

One of the top multi-brand groupings in the automotive sector is the Volkswagen Group. The Automotive and Financial Services divisions make up the Company's business operations. All of the brands in the automotive division are legally separate, independent businesses, except for the VW Passenger Cars and VW Commercial Vehicles brands.

### KEY GROUP FIGURES



The internal management process of the Volkswagen Group starts with a once-yearly, typically five-year medium-term planning that aligns with the business strategy. This serves as the foundation of our operational planning and is used to develop and confirm the specifications for implementing strategic initiatives that are intended to achieve the technical and financial goals of the Group.

In VW's opinion, sustainability entails simultaneously and vigorously pursuing economic, social, and ecological goals. Attempting to foster enduring principles, provide decent working conditions, and protect the environment.

In the case of VW Group, the Company was forced to start paying close attention to the use of resources and emissions of our product portfolio as well as those of our locations and plants as a result of the incidents from 2015, which forced the Company to lower pollutant emissions and reduce our carbon footprint continuously. As a result, our consumers receive the highest level of product safety thanks to our innovations and superb quality.

The Company's goals include regaining and enhancing consumer confidence and improving public perception of the Group. This process is critical to compliance with rules and regulations, creating secure processes, and handling errors honestly to prevent or correct them in the future. Regarding honesty, VW wants to set an example for a successful and transparent business.

The decarbonization index and emissions data, compliance, process reliability, and a zero-defect culture are critical KPIs for these goal dimensions (Figure 5).

| STRATEGIC KPIS: COMPETITIVE PROFITABILITY                             |                        |                                                |
|-----------------------------------------------------------------------|------------------------|------------------------------------------------|
|                                                                       | 2015                   | 2025                                           |
| Operating return on sales <sup>1</sup>                                | 6.0%                   | 7 to 8%                                        |
| Research and development ratio (R&D ratio) in the Automotive Division | 7.4%                   | ~6%                                            |
| Capex/sales revenue in the Automotive Division                        | 6.9%                   | ~6%                                            |
| Net cash flow in the Automotive Division                              | €8,887 million         | Positive, to allow a distribution ratio of 30% |
| Net liquidity in the Automotive Division                              | €24,522 million, 11.5% | ~10% of consolidated sales revenue             |
| Return on investment (ROI) in the Automotive Division                 | -0.2%                  | >15%                                           |
| <sup>1</sup> 2015 before special items                                |                        |                                                |

In 2016, the VW Group launched the most considerable change process in its history, laying the groundwork for long-term success in tomorrow's mobility industry and developing into a globally leading provider of sustainable mobility. 2016 is all about new beginnings and setting up the program Together Strategy 2025.



The Company's employees' knowledge, experience, and vision were combined in the strategy, which emerged at the Company's core. The strategy's name refers to the time horizon until 2025, representing thinking and acting in the long run with an eye toward the future. The mindset that will be even more crucial to the VW Group's success in the long run, is referred to by the term "TOGETHER."

Companies' sustainable transformation is essential to achieving these sustainability goals. Because it influences the vast majority of sustainability worldwide, the transformation of large companies is of the utmost importance (Helbig et al., 2021).

"It takes 20 years to build a reputation and five minutes to ruin it," famous investor Warren Buffett said. So, therefore, if you consider that, you will act differently."

Honesty, dependability, quality, and passion are the VW business's basics. Through the realignment, we will be able to maintain our technological edge over the competition and maintain our good competitiveness. As a result, VW will continue to be a great employer and an all-around compelling investment.

The corporate reputation of an organisation is the overall opinion that a stakeholder has of its performance over time. Regarding the effectiveness of the organisation, it represents the viewpoints of different stakeholders. Businesses with good reputations have a competitive advantage and are more likely to impact consumer attitudes and behaviours.

When news of the emissions scandal broke in September 2015, it impacted VW's share price, which fell by 20% then and by 20% two weeks later. Similarly, VW's sales in the United Kingdom decreased by another 20% in the month following the announcement. Within two months, sales in the United States had decreased by 25%, and VW had lost market share to rivals in their home country of Germany. After the event, sales fell for a year, and the share price was still down 30% a year later (VW, 2022).

#### INCOME STATEMENT BY DIVISION

| € million                                                       | VOLKSWAGEN GROUP |                | AUTOMOTIVE <sup>1</sup> |                | FINANCIAL SERVICES |               |
|-----------------------------------------------------------------|------------------|----------------|-------------------------|----------------|--------------------|---------------|
|                                                                 | 2016             | 2015           | 2016                    | 2015           | 2016               | 2015          |
| <b>Sales revenue</b>                                            | <b>217,267</b>   | <b>213,292</b> | <b>186,016</b>          | <b>183,936</b> | <b>31,251</b>      | <b>29,357</b> |
| Cost of sales                                                   | -176,270         | -179,382       | -150,860                | -155,553       | -25,410            | -23,829       |
| <b>Gross profit</b>                                             | <b>40,997</b>    | <b>33,911</b>  | <b>35,156</b>           | <b>28,382</b>  | <b>5,841</b>       | <b>5,528</b>  |
| Distribution expenses                                           | -22,700          | -23,515        | -21,453                 | -22,281        | -1,248             | -1,234        |
| Administrative expenses                                         | -7,336           | -7,197         | -5,730                  | -5,646         | -1,606             | -1,552        |
| Net other operating result                                      | -3,858           | -7,267         | -3,306                  | -6,761         | -552               | -506          |
| <b>Operating result</b>                                         | <b>7,103</b>     | <b>-4,069</b>  | <b>4,668</b>            | <b>-6,305</b>  | <b>2,435</b>       | <b>2,236</b>  |
| <b>Operating return on sales (%)</b>                            | <b>3.3</b>       | <b>-1.9</b>    | <b>2.5</b>              | <b>-3.4</b>    | <b>7.8</b>         | <b>7.6</b>    |
| Share of profits and losses of equity-accounted investments     | 3,497            | 4,387          | 3,433                   | 4,366          | 64                 | 21            |
| Finance costs and Other financial result                        | -3,308           | -1,620         | -3,217                  | -1,695         | -91                | 75            |
| <b>Financial result</b>                                         | <b>189</b>       | <b>2,767</b>   | <b>216</b>              | <b>2,671</b>   | <b>-27</b>         | <b>97</b>     |
| <b>Earnings before tax</b>                                      | <b>7,292</b>     | <b>-1,301</b>  | <b>4,884</b>            | <b>-3,634</b>  | <b>2,408</b>       | <b>2,333</b>  |
| Income tax expense                                              | -1,912           | -59            | -1,149                  | 527            | -763               | -586          |
| <b>Earnings after tax</b>                                       | <b>5,379</b>     | <b>-1,361</b>  | <b>3,735</b>            | <b>-3,107</b>  | <b>1,645</b>       | <b>1,747</b>  |
| Noncontrolling interests                                        | 10               | 10             | -81                     | -10            | 91                 | 19            |
| Earnings attributable to Volkswagen AG hybrid capital investors | 225              | 212            | 225                     | 212            | -                  | -             |
| <b>Earnings attributable to Volkswagen AG shareholders</b>      | <b>5,144</b>     | <b>-1,582</b>  | <b>3,591</b>            | <b>-3,310</b>  | <b>1,553</b>       | <b>1,728</b>  |

An intangible asset that increases value generation and provides a business with a sustainable competitive advantage is its reputation. According to Alsop (2004), reputation is an intangible asset that is very difficult to duplicate, making it an invaluable source of competitive advantage.

The 2015 scandal revealed unethical VW activities and damaged the Company's reputation internationally. Because of this, CEO Matthias Muller said at the time that the most urgent problem was building confidence via openness (Blackwelder et al., 2016).

## Strategic management processes and strategy processes for the Volkswagen Group

### SWOT Framework - Volkswagen Group

SWOT (see Fig. 2) analysis is a popular tool that goes beyond organisational strategy and is commonly used as a planning strategy. It is popular in practice and academics (Ghazinoory et al., 2011; 1997, Hill and Westbrook; Pickton & Wright, 1998). However, SWOT analysis often embodies the core idea of strategy since it explains and assesses an organization's plans in both its internal and external settings (Grant, 1991).

Throughout the process, internal and external aspects are assessed separately; this is crucial since companies may control certain internal situations but not others (Ghazinoory et al., 2011). Pickton & Wright (1998) claim that the method's success results from its simplicity.

#### Strengths

VW has 120 manufacturing facilities worldwide and operates in 160 production plants throughout the world (Fig. 4);

The Company currently controls more than 20% of the Chinese car market, and the Chinese car market is seeing an increase in consumer demand for luxury vehicles. With a prominent lineup, VW should take advantage of this opportunity to promote some of its high-end Chinese brands;

The automotive Company's extensive and varied product portfolio makes it significantly more appealing to customers;

The VW Group also provides various financial services, such as financing for customers and dealerships, leasing, banking, insurance, fleet management, and mobility services.

To develop autonomous technology and e-mobility services, the Group established a strong partnership with Microsoft and Amazon; Furthermore, approximately 45,000 High Power Charging (HPC) points are planned for Europe, China, and the United States by 2025 with the assistance of partners;

### Weaknesses

The "Dieselgate" incident, which happened in 2015 and destroyed the firm's brand and consumer confidence, caused a cost to the corporation of €16.2 billion.

Negative publicity is one of the organization's most serious disadvantages; not only did this imply that the business lost the faith of both its stakeholders and its consumers;

Another problem of the Group is the shifting exchange rate, which can affect the Company's income, especially when, for instance, the Company exchanges euros for dollars;

### Opportunities

The Company has tremendous chances to grow in this nation with its luxury to meet any consumer expectations because of the Chinese auto market demand (Figure 3); Moreover, the Group has ample revenue-generating opportunities for luxury car growth as a result of rising of the demand in America;

### Threats

VW Automobile is significantly threatened by the fierce competition in the automotive sector; the growth of e-mobility companies like Tesla and Google also threatens the conventional automotive industry;

The Company's profits have decreased and will continue to be impacted by the emission scandal from 2015, which resulted in a damaged brand reputation, fines totaling €16.2 billion, and a loss of consumer purchase confidence;

Due to government rules on greenhouse gas emissions, fuel prices, and environmental activities, the Company may see an increase in manufacturing costs;

Government regulation reforms are putting the Company in threat; The Covid19 epidemic has hit the Group's income;

In 2021, business at VW and its brands suffered due to the Covid-19 pandemic and the shortage of semiconductors that limited vehicle availability. VW had an operating result before special items of €20.0 (10.6) billion in the reporting year. The diesel issue impacted special items by €-0.8 (-0.9) billion on the operating result. VW sold 8.6 (9.2) million vehicles in the year under review. Mix-related factors contributed to an increase of 12.3% in sales revenue to €250.2 billion;

A further external threat is a Russia-Ukraine war, which began in 2022 and has disrupted and impacted the automobile sector globally. The UK Brexit was another threat to the Company and had a significant economic impact on market sales.

## The VRIO Framework - Volkswagen Group

The internal resources of VW will be examined separately as part of the VRIO Analysis (Fig. 1) to see if they offer a long-term competitive advantage. In addition, the VW VRIO Analysis specifies whether these resources may be enhanced to offer a significant competitive advantage at each step.

VRIO acronym stands for V = value, R = rarity; I = imitability and O = organisational.

### Valuable

The VW VRIO Analysis demonstrates that VW's financial resources are valuable because they enable the Company to invest in new external opportunities. Additionally, these aids VW in combating external dangers;

The VRIO Analysis of VW claims that the Company's highly differentiated product range is a valuable resource. Customers have a high sense of value for these as a result. Customers also value these products more than the competition because they are different from one another;

VW's staff members are an essential asset for the Company. The enhanced productivity brought about by a significant fraction of the workforce's high level of training helps the business. Because of their commitment, the employees have a high retention rate for the Company. All of this translates to higher financial value for VW's consumers;

The VRIO Analysis of VW concludes that the Company's patents are valuable since they enable the sale of its products free from competition. As a result, VW earns more money significantly. Additionally, when VW licenses these patents to other manufacturers, it earns licensing income;

Its distribution network of VW is a valuable asset. This enables it to connect with an increasing number of clients. This guarantees Volkswagen higher revenues. Additionally, because the items are easily accessible, it ensures that promotional efforts result in sales.

The VRIO Analysis of VW concludes that its cost structure is not a helpful resource. This is so because the firm's total profitability is impacted by manufacturing practices that result in more extraordinary expenses than the competitors. Consequently, it has to focus on its cost structure, which is a competitive disadvantage;

The research and development at Volkswagen is not a viable resource, according to the VRIO analysis. This is so because innovation gains from research and development are more significant than their costs. As a result, there have not been many ground-breaking innovations and products in the last few years.

## Rare

The VRIO Analysis of VW finds that the Company's patents are valuable because they enable the Company to sell its products without interference from competitors. These patents also provide VW with licensing revenue when it licenses them to other manufacturers; this results in more substantial revenue for VW.

The VRIO Analysis of VW concluded that the Company's personnel are a precious resource. Unlike employees at other companies, these workers have extensive training and expertise. These workers are less likely to depart for other companies because of the superior pay and working conditions;

The VW VRIO Analysis recognised VW patents as a scarce resource. These patents are hard to come by and are not in the hands of rivals. VW may employ them without intervention from the opposition thanks to this;

VW's distribution network is a valuable resource. This is because it would take a lot of money and effort for rivals to develop a distribution network that is superior to VW. Very few businesses in the sector also possess these;

## Imitable

The VW VRIO Analysis reveals that it is costly to duplicate VW's financial resources. The business has acquired these resources through sustained profits over time. In order to accumulate these amounts of financial resources, competitors and new entrants would need to make similar profits for an extended period;

The VW VRIO Analysis found that VW personnel are not expensive to mimic. This is so that other businesses may help their staff develop their abilities. These businesses may attract workers from VW by providing higher pay, working conditions, perks, career prospects, Etc. As a result, VW personnel become a resource that offers a short-term competitive advantage. Future competition may obtain these;

The VRIO Analysis of VW concluded that the patents of VW are challenging to copy. This is due to the fact that copying a patented product is illegal. The process of developing such resources and obtaining a patent for them is likewise expensive;

The VW VRIO Analysis found that copying the competition's distribution network would be exceedingly expensive. VW has steadily developed this over the years. If competitors want to copy a comparable distribution system, they will need to invest money;

## Organization

VW's financial resources are set up to maximise value. These resources are employed strategically to make the best investments, take advantage of opportunities, and counter dangers. Consequently, these resources allow VW to maintain a competitive edge;

The VRIO Analysis of VW identified the organization of the Company's distribution network. The Company uses this network to reach customers by ensuring that products are available in all locations. As a result, VW enjoys a sustained competitive advantage thanks to these resources.

## Conclusion and Recommendations

In conclusion, strategic management is an outgoing process that assesses and controls an organization's operations and industry participation; sets goals and strategies to address all current and potential rivals; assesses its competitors; and then routinely assesses strategies to determine how well they have performed and whether they need to be replaced.

Good performance results from effective business management's interactions with the organization's internal or external environment. In this sense, the business has to steer clear of trends connected to its shortcomings and focus its future objectives on its strengths. Therefore, responding to internal strengths and shortcomings is crucial to strategic management.

### Recommendations

In this regard, a strong suggestion is that the Company invest more in research and development. Moreover, to regain the trust of the customers after the incident from 2015 with the changing of the software that was impacting the environment and the customer's trust, Another recommendation is that the Group must stay focused and transparent and follow its strategy TOGETHER 2025 and regain credibility in the eye of its Shareholders;

Another suggestion is to invest and expand in e-mobility because there is an increase in consumer environmental consciousness also the Government changing laws and regulations that strongly impact the traditional automotive industry.

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## Appendix

Figure 1.

### VRIO Framework

|          |                                                                                                                                                                  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>V</b> | <b>Value:</b> Do resources and capabilities exist that are valued by customers and enable the organisation to respond to environmental opportunities or threats? |
| <b>R</b> | <b>Rarity:</b> Do resources and capabilities exist that no (or few) competitors possess?                                                                         |
| <b>I</b> | <b>Inimitability:</b> Are resources and capabilities difficult and costly for competitors to obtain and imitate?                                                 |
| <b>O</b> | <b>Organisational support:</b> Is the organisation appropriately organised to exploit the resources and capabilities?                                            |

Figure 2. (A)

### SWOT Analysis

|                  |                   | Internal factors                                                                                           |                                                                                                                    |
|------------------|-------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|                  |                   | Strengths (S)                                                                                              | Weaknesses (W)                                                                                                     |
| External factors | Opportunities (O) | <b>SO Strategic options</b><br>Generate options here that use strengths to take advantage of opportunities | <b>WO Strategic options</b><br>Generate options here that take advantage of opportunities by overcoming weaknesses |
|                  | Threats (T)       | <b>ST Strategic options</b><br>Generate options here that use strengths to avoid threats                   | <b>WT Strategic options</b><br>Generate options here that minimise weaknesses and avoid threats                    |

Figure 2. (B)

|                  |                            | INTERNAL FACTORS                                                                                     |                                                                                                |
|------------------|----------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                  |                            | INTERNAL STRENGTHS (S)                                                                               | INTERNAL WEAKNESSES (W)                                                                        |
| EXTERNAL FACTORS | EXTERNAL OPPORTUNITIES (O) | Opportunities that can be taken advantage of with strengths<br>→ <b>SO strategies:</b> use strengths | Opportunities that are missed due to weaknesses<br>→ <b>WO strategies:</b> overcome weaknesses |
|                  | EXTERNAL THREATS (T)       | Threats that can be countered by strengths<br>→ <b>ST strategies:</b> apply strengths                | Threats that are favored by weaknesses<br>→ <b>WT strategies:</b> prevent weaknesses           |

Figure 3.

### Volkswagen's brand portfolio



Figure 4.

120 production plants



(Source: Volkswagen, 2021)

Figure 5

## Environmental Management KPI for Volkswagen

GRI 302-1, 302-4

ENVIRONMENTAL MANAGEMENT KPIS<sup>1</sup>

| KPI                                                                             | Unit                | 2021  | 2020  | Notes and comments                 |
|---------------------------------------------------------------------------------|---------------------|-------|-------|------------------------------------|
| Sites certified in accordance with ISO 14001 or EMAS in the Volkswagen Group    | Number              | 110   | 107   |                                    |
| Proportion of these in terms of number of employees                             | in %                | 99.6  | 99    |                                    |
| Production sites certified in accordance with ISO 50001 in the Volkswagen Group | Number              | 65    | 59    |                                    |
| Production sites certified in accordance with ISO 50001 in Volkswagen AG        | Number              | 6     | 6     |                                    |
| Sites certified in accordance with ISO 14001 or EMAS in Volkswagen AG           | Number              | 6     | 6     |                                    |
| Proportion of these in terms of number of employees                             | in %                | 100   | 100   |                                    |
| <b>Specific emissions reduction (strategic KPIs)</b>                            |                     |       |       |                                    |
| <b>in the Volkswagen Group</b>                                                  |                     |       |       |                                    |
| Change in overall environmental impact of production (UEP)                      | in %                | -29.0 | -32.4 |                                    |
| Change in specific energy requirements                                          | in %                | -3.5  | -12.4 |                                    |
| Change in CO <sub>2</sub> emissions                                             | in %                | -33.3 | -35.2 |                                    |
| Change in specific VOC emissions                                                | in %                | -62.0 | -61.7 |                                    |
| Change in specific water consumption                                            | in %                | -11.6 | -17.1 |                                    |
| Change in specific waste for disposal                                           | in %                | -61.6 | -57.3 | Only production-specific volumes   |
| <b>in Volkswagen AG</b>                                                         |                     |       |       |                                    |
| Change in overall environmental impact of production (UEP)                      | in %                | 9.4   | -11.3 |                                    |
| Change in specific energy requirements                                          | in %                | 20.8  | -7.2  |                                    |
| Change in specific CO <sub>2</sub> emissions                                    | in %                | 19.9  | -6.3  |                                    |
| Change in specific VOC emissions                                                | in %                | -15.1 | -18.9 |                                    |
| Change in specific water consumption                                            | in %                | 19.7  | 4.7   |                                    |
| Change in specific waste for disposal                                           | in %                | -25.6 | -40.4 | Only production-specific volumes   |
| <b>Energy consumption</b>                                                       |                     |       |       |                                    |
| Energy consumption in the Volkswagen Group                                      | in million MWh/year | 21.98 | 21.62 |                                    |
| of which in Volkswagen AG                                                       | in million MWh/year | 4.76  | 4.65  |                                    |
| Energy consumption in the Volkswagen Group                                      | in kWh/vehicle      | 2,432 | 2,207 | Cars and light commercial vehicles |
| of which Volkswagen AG                                                          | in kWh/vehicle      | 7,246 | 5,570 |                                    |
| Heat energy consumption – cars & light commercial vehicles                      | in million MWh/year | 5.89  | 5.33  |                                    |
| Heat energy consumption – Volkswagen AG                                         | in million MWh/year | 1.89  | 1.60  |                                    |
| Heat energy consumption – other divisions                                       | in million MWh/year | 0.76  | 0.71  |                                    |

SUSTAINABILITY IN THE GROUP'S DNA

| KPI                                                                                                 | Unit                | 2021   | 2020   | Notes and comments                 |
|-----------------------------------------------------------------------------------------------------|---------------------|--------|--------|------------------------------------|
| Total electricity consumption in the Volkswagen Group (as a proportion of total energy consumption) | in %                | 50     | 52     |                                    |
| in Volkswagen AG                                                                                    | in %                | 43     | 46     |                                    |
| Total electricity consumption (absolute)                                                            | in million MWh/year | 11.05  | 11.20  |                                    |
| in Volkswagen AG                                                                                    | in million MWh/year | 2.04   | 2.12   |                                    |
| <b>VOC emissions</b>                                                                                | in metric tons/year | 13,593 | 14,856 |                                    |
| of which cars and light commercial vehicles                                                         | in metric tons/year | 12,506 | 13,700 |                                    |
| of which Volkswagen AG                                                                              | in metric tons/year | 1,118  | 1,339  |                                    |
| of which other divisions                                                                            | in metric tons/year | 1,087  | 1,156  |                                    |
| <b>VOC emissions</b>                                                                                | in kg/vehicle       | 1.57   | 1.58   | Cars and light commercial vehicles |
| of which Volkswagen AG                                                                              | in kg/vehicle       | 1.77   | 1.69   |                                    |
| <b>Freshwater</b>                                                                                   |                     |        |        |                                    |
| Freshwater volume                                                                                   | in million m³/a     | 39.69  | 41.77  |                                    |
| of which cars and light commercial vehicles                                                         | in million m³/a     | 32.07  | 32.65  |                                    |
| of which Volkswagen AG                                                                              | in million m³/a     | 3.62   | 3.98   |                                    |
| of which other divisions                                                                            | in million m³/a     | 7.62   | 9.12   |                                    |
| Freshwater volume                                                                                   | in m³/vehicle       | 4.02   | 3.77   | Cars and light commercial vehicles |
| of which Volkswagen AG                                                                              | in m³/vehicle       | 5.74   | 5.02   |                                    |
| <b>Waste for disposal</b><br>(only production-specific volumes)                                     |                     |        |        |                                    |
| Nonhazardous waste                                                                                  | in metric tons/year | 28,961 | 36,130 |                                    |
| of which cars and light commercial vehicles                                                         | in metric tons/year | 25,019 | 30,611 |                                    |
| of which Volkswagen AG                                                                              | in metric tons/year | 1,439  | 1,311  |                                    |
| of which other divisions                                                                            | in metric tons/year | 3,942  | 5,519  |                                    |
| Hazardous waste                                                                                     | in metric tons/year | 54,369 | 63,313 |                                    |
| of which cars and light commercial vehicles                                                         | in metric tons/year | 46,480 | 55,612 |                                    |
| of which Volkswagen AG                                                                              | in metric tons/year | 8,738  | 8,909  |                                    |
| of which other divisions                                                                            | in metric tons/year | 7,889  | 7,701  |                                    |
| Nonhazardous waste                                                                                  | in kg/vehicle       | 3.13   | 3.53   | Cars and light commercial vehicles |
| of which Volkswagen AG                                                                              | in kg/vehicle       | 2.28   | 1.65   |                                    |
| Hazardous waste                                                                                     | in kg/vehicle       | 5.82   | 6.41   | Cars and light commercial vehicles |
| of which Volkswagen AG                                                                              | in kg/vehicle       | 13.83  | 11.24  |                                    |
| "Massnahmen@web" measures implemented                                                               | Number              | 1,544  | 1,520  |                                    |
| in Volkswagen AG                                                                                    | Number              | 467    | 452    |                                    |