



Volkswagen

ID.

INSIGHTS

SUSTAINABLE E-MOBILITY

BOOKLET

DRESDEN, FEBRUARY 2019

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Please note:

You can find this press release and the images and films on Volkswagen Electromobility on the Internet at www.volkswagen-newsroom.com.

*The study is not yet being offered for purchase and is therefore not subject to Directive 1999/94 EC.

AT A GLANCE

KEY FACTS ON SUSTAINABLE MOBILITY

> **Global responsibility:** Volkswagen is committed to the Paris climate goal of restricting the global temperature increase to well below 2 degrees and it has a clearly defined plan.

> **Contribution to climate protection:** Volkswagen is taking social responsibility and it is being transformed into the world's leading global provider of sustainable mobility.

> **We are decarbonising the car:** Volkswagen will be continuously reducing the CO₂ emissions of its vehicle fleet towards zero by 2050.

> **100 percent CO₂-neutral:** The ID. is charged with green electricity and it will be the first volume-production vehicle to have a CO₂-neutral footprint.

> **Focused drive strategy:** Volkswagen is strategically committed to the battery-powered electric drive as the most efficient option for cutting down CO₂ that is available today.



> **Most extensive e-offensive in the global automotive sector:**

By 2025, Volkswagen will have increased the number of pure e-vehicles to more than 20 – including the ID. Family based on the new MEB electric platform.

> **Democratisation of e-mobility:** The modular electric drive matrix (MEB) is empowering us to develop opportunities for electric cars without any compromises, to gain huge scale effects and to make the electric car affordable for millions of people.

> **Maximum efficiency and productivity:** The Volkswagen plants in Zwickau, Emden and Hannover are being converted to become the biggest network for production of e-vehicles in Europe.

> **Important future investments:** By 2023, Volkswagen will have invested around 11 billion euros in the technological paradigm change and the digitalisation of vehicles. Around 9 billion euros are being channelled into electromobility.

> **Strong together:** The automobile industry cannot achieve a breakthrough for e-mobility on its own. At the same time, consistent political support is necessary for building up a nationwide charging infrastructure and for switching energy supply from fossil fuels to renewable energy sources.



*„We are orienting
the company
towards clean
mobility.“*

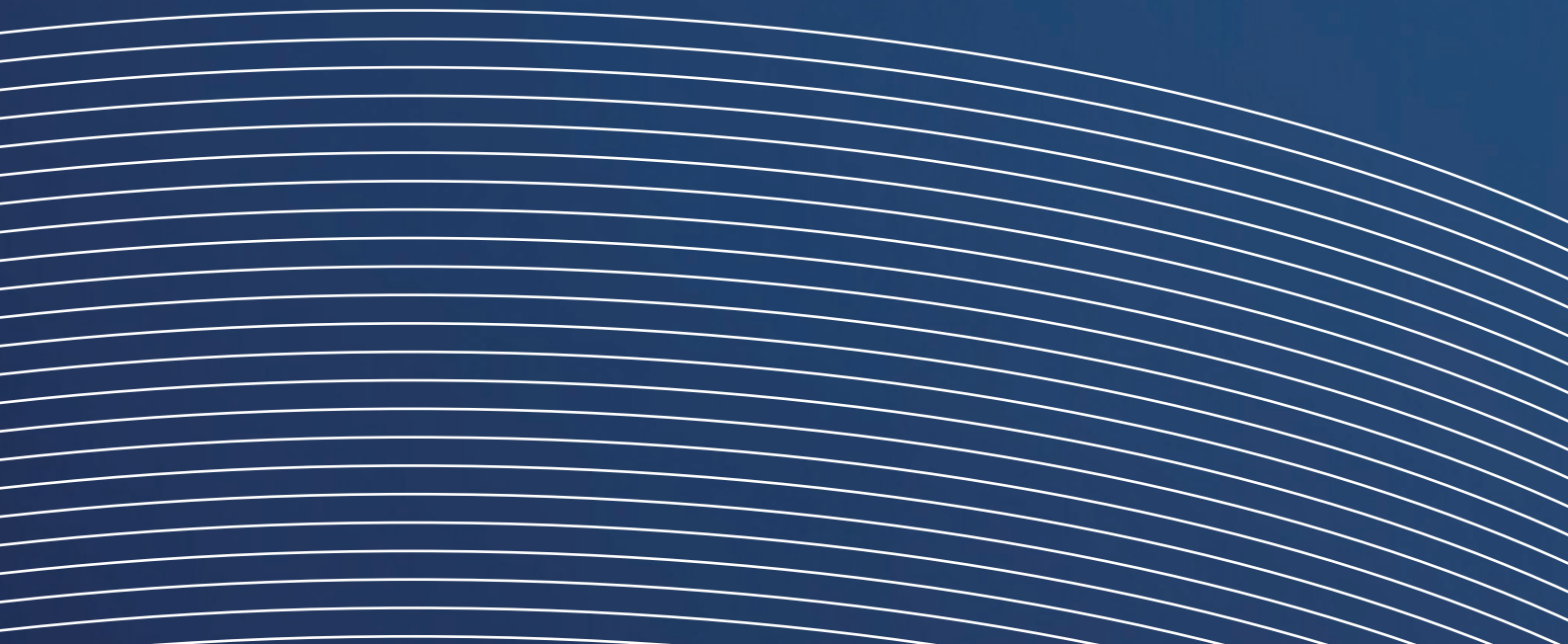
DR. HERBERT DIESS,
CHAIRMAN OF THE
BOARD OF MANAGEMENT
OF VOLKSWAGEN AG
AND CHAIRMAN OF
THE VOLKSWAGEN
PASSENGER
CARS BRAND



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KEY ASPECTS

VOLKSWAGEN IS TRANSITIONING TO A WORLD-LEADING PROVIDER OF SUSTAINABLE MOBILITY



KEY ASPECTS

VOLKSWAGEN IS TRANSITIONING TO A WORLD-LEADING PROVIDER OF SUSTAINABLE MOBILITY



„At Volkswagen, we want to make a substantial contribution to climate protection. The ID. will take on a pioneering role in this regard; its production will balance out as CO₂-neutral across the entire supply and production chain.“

THOMAS ULBRICH,
MEMBER OF THE BOARD OF
MANAGEMENT OF THE VOLKSWAGEN
BRAND RESPONSIBLE FOR E-MOBILITY

„The CO₂ emissions caused by people must be reduced as quickly as possible. Since it was established, the Volkswagen Sustainability Advisory Board has made great efforts to ensure that the company gives strategic priority to climate protection. Volkswagen has charted the right course with its e-offensive and the ID. The mission now is to provide strategic implementation.“



GEORG KELL,
SPOKESPERSON OF THE
SUSTAINABILITY ADVISORY BOARD



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„We need to reduce CO₂ emissions as quickly as possible. Volkswagen is making a contribution to this objective – with sustainable e-mobility for everybody.“

CHRISTIAN SENGER,
HEAD OF MODEL LINE E-MOBILITY

„For Volkswagen, it is important to receive the opinion and advice of representatives of key stakeholders who accompany the company critically and independently in its transformation.“



RALF PFITZNER,
HEAD OF GROUP SUSTAINABILITY

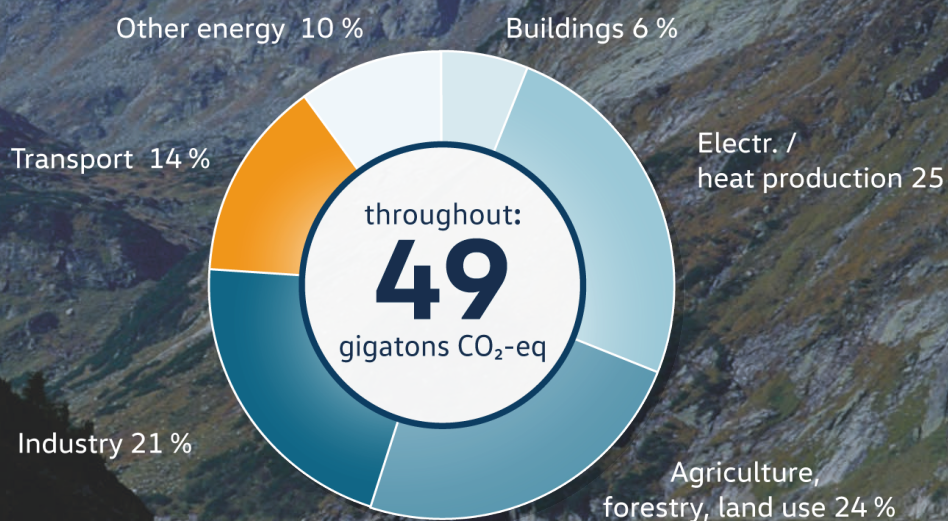


„Our vision is 100% CO₂-neutral e-mobility.“

DR. MICHAEL LIEBERT,
HEAD OF SUSTAINABILITY VW PASSENGER CARS

TRANSPORT ACCOUNTS FOR ABOUT ONE SEVENTH

Global CO₂ emissions by sector



Source: IPCC 2014, EEA 2018



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KEY ASPECTS

VOLKSWAGEN IS TRANSITIONING TO A WORLD-LEADING PROVIDER OF SUSTAINABLE MOBILITY

THE TARGET IS 100 PERCENT CLIMATE NEUTRALITY

Volkswagen is taking social responsibility for the climate and is aligning the company strategically with clean mobility. Our vision is to facilitate carbon-neutral mobility for people and goods throughout the world. At the climate summit in Paris, the international community made a commitment to limit global warming to well below 2 degrees. These targets also form the benchmark for the actions of Volkswagen. Although we are unable to overcome the big political challenges relating to climate on our own, we are approaching the issue with a clearly defined plan. In concrete terms, it looks like this: Volkswagen is

committed to the target of keeping the global temperature increase according to the Paris Agreement. In pursuit of this aim, we will be continually reducing the CO₂ emissions of our vehicle fleet towards zero by 2050. In order to strategically implement this goal, Volkswagen will have invested around 11 billion euros by 2023 in the digitalisation of vehicles and plants, and in carbon-neutral production including the supply chain and manufacture of battery cells. Around 9 billion euros from this investment will be channelled into electromobility.



V. Drogas
2019

Chernov

Volkswagen Design



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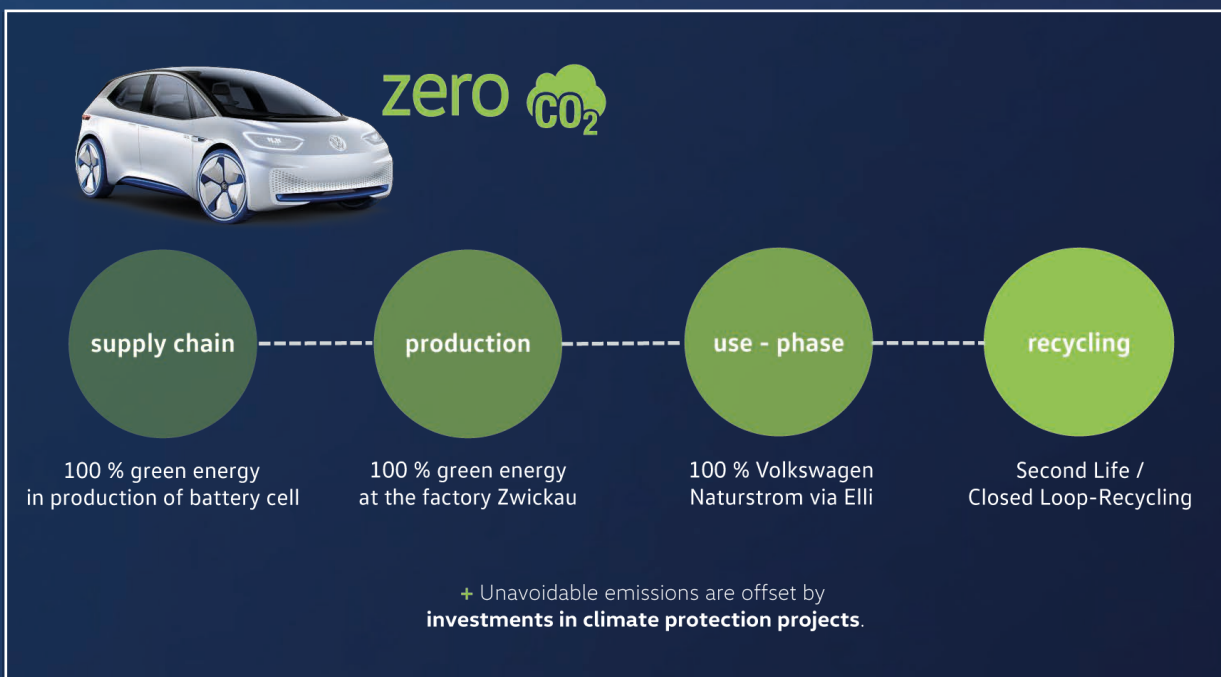
MOST EXTENSIVE E-OFFENSIVE IN THE GLOBAL AUTOMOTIVE SECTOR

Today, the conversion to battery-powered electric drive is the most efficient option for reduction of CO₂ levels. This is a key lever as far as Volkswagen is concerned. And the first steps have already been undertaken. The Volkswagen ID. is the first model to be manufactured on the basis of the new MEB electric platform. The clearly-defined platform orientation and significantly less complexity are simultaneously empowering us to create the enablers for greater efficiency and higher productivity at the plants. While it continues to operate without interruption, the Zwickau plant is being converted from today's status of 100 percent internal combustion engine to 100 percent electric drive.

It represents the world's first complete transformation of an industrial-scale automobile production facility to e-mobility. Starting in 2022, all-electric vehicles will roll off the assembly line at plants in Emden and Hannover. Taken together, these three locations will become the biggest and most efficient e-production network in Europe, and this will create a key prerequisite for the e-fleet and hence for achieving CO₂ targets. Furthermore, the locations of Volkswagen Group Components in Salzgitter, Braunschweig and Hannover are building up sustainable competence in battery cells, as well as developing and producing battery systems for e-vehicles based on the Volkswagen's Modular Electric Drive Kit (MEB).

THE NEW ID.: BALANCE SHEET CO₂-NEUTRAL

Emission values are reduced along the entire value chain





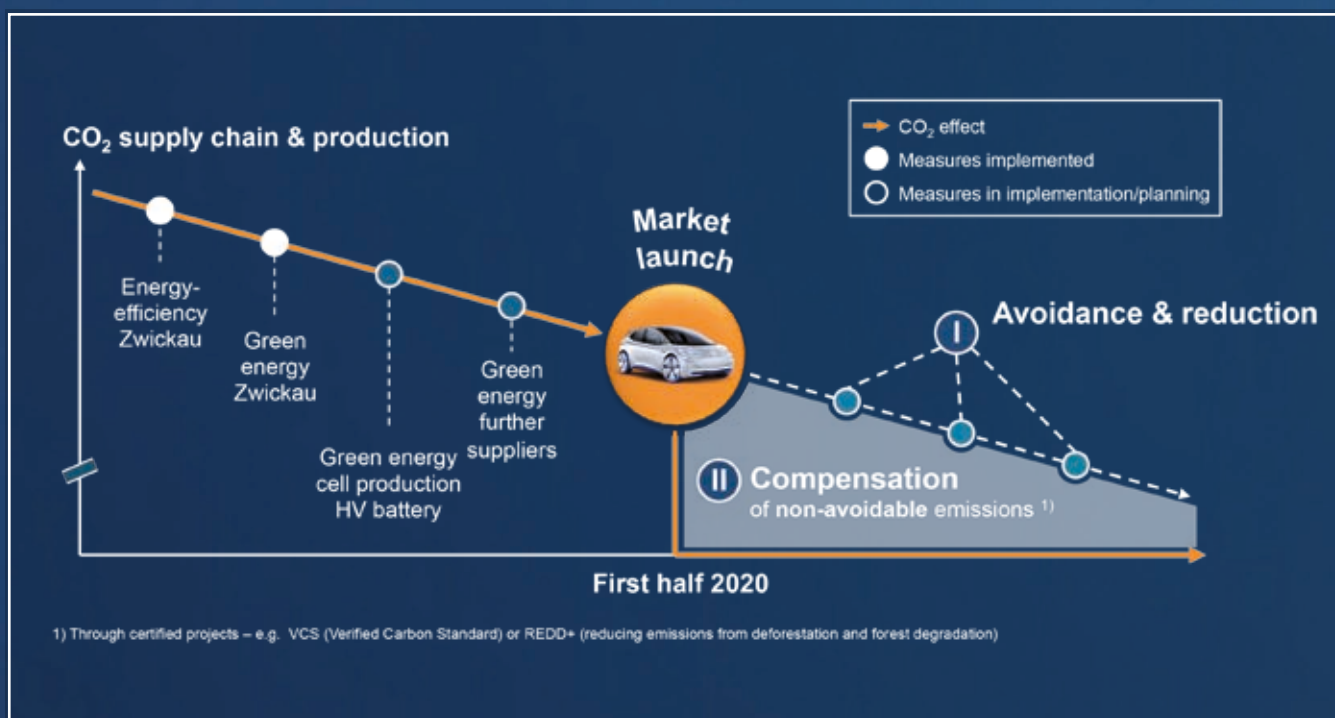
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ID. IS BECOMING A MILESTONE FOR CO₂-NEUTRAL MOBILITY

The market launch of the ID. in 2020 will signal the kick-off for the most extensive e-offensive in the global automotive sector which will mark a milestone on the journey towards climate-neutral mobility. This is because the vehicle will be delivered to the customer as an electric car with a 100 percent CO₂-neutral footprint. To this end, Volkswagen is addressing the entire value chain from procurement to recycling. Our decarbonisation index enables us to reflect the climate relevance of all vehicles over their lifecycle and it provides a metric for assessing progress. Production processes in Zwickau will be carried out with a carbon-neutral footprint. Green electricity will be used for the production of battery cells at suppliers. We will also ensure

that our suppliers maintain the clear principle of avoiding and reducing CO₂ wherever possible. In accordance with this principle, they will also mitigate unavoidable emissions by making investments in climate-protection projects. In the use phase, customers will be able to have carbon-neutral driving with the ID. if they decide to use green electricity. The newly established Volkswagen subsidiary Elli will also offer a broadly-based portfolio of wall boxes and charging solutions to facilitate the supply of sustainable electricity by the time the ID. has been launched in the marketplace in 2020. The IONITY joint venture is also enabling us to build up a powerful and sustainable fast charging system within Europe.

CONSISTENT REDUCTIONS IN CO₂ EMISSIONS IN PRODUCTION AND SUPPLY CHAIN





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KEY ASPECTS

SUSTAINABILITY ALONG THE ENTIRE SUPPLY CHAIN

GREATER TRANSPARENCY IN THE ENTIRE SUPPLY CHAIN

Along with the launch of the ID., Volkswagen is strategically tightening up the entire value chain with the aim of avoiding and reducing CO₂ emissions, and complying with social standards. This starts with raw materials supply and finishes with the product. In turn, we therefore expect maximum transparency and provision of information

from our suppliers in relation to compliance with the agreed sustainability standards. So that we can identify potentially suspicious cases, Volkswagen has already identified more than 500 mines and smelting facilities in order to further enhance transparency for the production of relevant raw materials.

„Sustainability standards are a binding selection criterion for our suppliers in the same way as quality or price. We intend to consistently follow up rule breaches and grievances.“

MARCO PHILIPPI,
CORPORATE DIRECTOR,
STRATEGY GROUP PROCUREMENT







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SUSTAINABILITY AS SELECTION CRITERION

Volkswagen intends to ensure that environmental and social standards at business partners are taken into account with binding effect. In future, there will therefore be a sustainability rating which is to include the assessment of suppliers. The rating means that sustainability will constitute an equally important selection criterion with the same status as cost, quality, technological expertise and innovative strength.

The complexity and global alignment with more than 40,000 direct suppliers across the world make compliance with environmental and social standards along the entire supplier chain

a function that even large groups are unable to monitor satisfactorily on their own. As a consequence, Volkswagen participates in cross-sector initiatives such as the working group "Drive Sustainability" with other international automobile manufacturers in order to achieve even more transparency in the supply chain. Volkswagen is also a founding member of the Global Battery Alliance of the World Economic Forum. This is an alliance between Volkswagen and partners like UNICEF and the Organisation for Economic Development (OECD) that carries out work on areas such as joint standards for sustainable production of raw materials for batteries.

KEY ASPECTS

CO₂-NEUTRAL PRODUCTION



„We use a range of tools to fulfil our CO₂ goals including the enhancement of energy efficiency and the production of electricity from regenerative sources. From the end of 2019, the Zwickau location will produce the ID. with an entirely CO₂-neutral footprint.“

DR. LIENDEL CHANG,
HEAD OF ENVIRONMENTAL PRODUCTION



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Volkswagen is increasing the use of renewable energy in production with the aim of continuing to reduce its environmental footprint. Since 2010, the brand has reduced its CO₂ generation worldwide by 40.4 percent with its Think Blue. Factory. environmental programme. As part of reducing the environmental impact of production, the factors of energy, water, waste and solvent emissions are being consistently reduced alongside the CO₂ indicator. By 2018, we brought down the consumption of resources at our locations by 30 percent compared with the baseline year of 2010. By 2025, we want to achieve 45 percent. Our vision is the Zero Impact Factory – the footprint of 100 percent carbon-neutral production without any impacts on the environment. In order to achieve this goal, Volkswagen locations in the global production network are systematically exchanging experiences about their specific concepts for success and they are adopting best-practice measures from each other with the aim of generating additional potential savings.

Zwickau will build the Volkswagen ID. with a CO₂-neutral footprint

The measures implemented over the past nine years have already resulted in a total reduction in CO₂ of 66 percent compared with the year 2010 at the Zwickau plant – while simultaneously increasing the volume of vehicles produced by three percent. From the end of 2019, the ID. will be produced with an entirely carbon-neutral footprint at the facility. This will be possible owing to high levels of energy efficiency, a highly efficient compact cogeneration plant at the facility and the use of Volkswagen Naturstrom® – green electricity generated from 100 percent renewable energy such as hydropower. Non-avoidable CO₂ emissions are balanced out by climate protection projects. The paint facility is going to be assessed and analysed with a view to achieving additional potential savings. This area is the process stage with the greatest environmental relevance throughout vehicle production.

KEY ASPECTS

OFFERINGS FOR ZERO CARBON USAGE

„Volkswagen has a holistic commitment since we are creating an environmental system for charging and energy that extends beyond the automobile.“



SILKE BAGSCHIK,
HEAD OF MARKETING AND SALES
FOR THE PRODUCT LINE E-MOBILITY
OF THE VOLKSWAGEN BRAND



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Punctually for the market launch of the ID. in 2020, Volkswagen will launch a succession of numerous charging solutions with energy packages from renewable sources for use at home and on the move. This initiative underscores the company's strategic goal of becoming the world-leading provider of sustainable mobility.

Customers should be able to drive the electric car with zero carbon emissions during the use phase if they opt for charging with green electricity. Through the newly established subsidiary company Elli, Volkswagen will create a seamless and sustainable ecosystem for the most important applications of users of electric cars and fleet operators – with smart electricity tariffs, IT-based energy management systems, and charging stations and charging cards for convenient digital billing.

EASY CHARGING – ALWAYS AND EVERYWHERE

Customers will be given a choice between different wall box versions for safe, fast and convenient charging at home. The plans include 11 kW wall boxes that take five to eight hours for 100 percent battery charging. Beyond that, fast 22 kW wall boxes are envisaged with significantly shorter charging times of three to four hours. By 2020, Volkswagen is also going to expand the number of charging points in employee car parks from the current level of 1000 to more than 5000 stations. Over the same period, all 5500 Volkswagen dealers and service partners in the EU will be equipped with several charging options available to customers and the general public. The Volkswagen We mobility platform will allow customers to find stations and give them an easy method of payment through the “We Charge” service.





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ESTABLISHMENT OF A SUSTAINABLE CHARGING INFRASTRUCTURE

Our activities for expanding infrastructure and energy solutions in cities and local communities are also trendsetting. The flexible fast charging station developed by Volkswagen Group Components can make an important contribution here. The mobile charging station can be charged using solar or wind energy. It operates on the principle of a power bank as used by many people for their mobile phones – but in this case it happens to be for electric vehicles. It can be set

up independently of the power grid and deployed flexibly wherever it is needed. It provides autonomous operation for fast charging with up to 100 kW for electric vehicles like the new ID.

The company IONITY jointly established by Volkswagen is currently building up a network of fast charging stations for journeys over long distances along European motorways. 400 stations are projected to have been set up in Europe by 2020.



„Charging will become fast, easy, convenient and – if the customer opts to use green electricity – clean. In 2020, the Volkswagen subsidiary Elli will also offer a broadly-based portfolio of wall boxes and charging solutions with sustainable electricity.“

MARTIN ROEMHELD,
HEAD OF E-MOBILITY
SERVICES AT THE VOLKSWAGEN BRAND

KEY ASPECTS

EFFICIENT RECYCLING



„At the end of a vehicle’s life, the battery is a valuable source of raw materials for us – for example for using a second time in new products such as the flexible fast charging station that Group Components is manufacturing at the Hannover location from 2020.“

THOMAS TIEDJE,
HEAD OF TECHNICAL PLANNING,
VOLKSWAGEN GROUP COMPONENTS



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INNOVATIVE SECOND USE AND EFFICIENT RECYCLING

The lithium-ion battery is a key element of the e-offensive being rolled out by Volkswagen. The new and independent brand Volkswagen Group Components is taking over end-to-end responsibility for the battery – from building up expertise for cell production

through to recycling. At the end of the lifetime of the vehicle, the battery can be reused in second-life concepts – or it becomes a valuable source of raw materials through established recycling procedures.



VOLKSWAGEN
GROUP COMPONENTS





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SECOND LIFE IN A FLEXIBLE FAST CHARGING STATION

Today, development engineers and production planners at the Centre of Excellence (CoE) located at the Salzgitter component facility are already building up sustainable expertise in battery cells. They are investigating whether their high residual capacities render batteries suitable for second use in new

products such as the flexible fast charging station which Group Components will manufacture at the Hannover location from 2020. The engineering of the charging station is based on the battery pack of the Modular Electrification Toolkit (MEB) and it is designed on the basis of its cell modules.

PILOT PLANT FOR RECYCLING IN SALZGITTER

At any rate, after it has come to the end of its life in a car, the lithium-ion battery is a valuable source for reuse of raw materials that are in some cases scarce. For this reason, up to 1200 metric tons of batteries will be recycled at the component location in Salzgitter from 2020. The aim is to return as many valuable materials as possible to

circulation. Apart from recovery of aluminium, steel and copper, the focus is on reusable nickel, manganese and cobalt. Established processes are being reviewed for technical and economic scalability. The objective is to reuse 97 percent of all materials when larger volumes of batteries are returned from the market at the end of the 2020s.



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