Commercial Vehicles

We Transport Success

VW Commercial Vehicles e-Mobility Guide

Version 1.0

Hanover | March 2021

Classification: Confidential

Commercial Vehicles

Welcome to the e-Mobility Guide for Volkswagen Commercial Vehicles!

Lars Menge
Head of Product Marketing at VWCV

"The secret of change is to focus all of your energy, not on fighting the old, but on building the new."
(Socrates)

The Volkswagen Group is committed to the 2°-goal of the Paris Climate Agreement. We have made a voluntary commitment to becoming carbon-neutral by the year 2050! To achieve this goal, we must make the transition towards electric mobility (e-mobility). As Volkswagen Commercial Vehicles (VWCV) is a brand that focuses on light commercial vehicles with a gross permissible weight of up to 6 tonnes and also larger passenger vehicles/mobile homes, this transformation process presents us with a particularly huge challenge given our diverse range of products, customers and vehicle uses. Heinz Jürgen Löw, Member of the VWCV Board of Management responsible for Sales and Marketing, set me the task of advancing this transformation as quickly and effectively as possible.

I am firmly of the belief that the success of this transformation will start with knowledge of what e-mobility entails. To fulfil this goal, my number one priority was to set up an eReadiness Team in Product Marketing as quickly as possible and establish it at VWCV. I am delighted to inform you that the team has been complete since early 2021 and is working hard. They are completely dedicated to this transformation. This e-Mobility Guide brings together all the relevant information related to electric mobility in one document and will be updated on a regular basis.

Our shared vision is to make our customers' lives easier, more sustainable and more successful. The eReadiness Team is on hand to provide advice at any time so that we can reach our collective goal. I hope you enjoy reading and can learn a lot from this guide. At the same time, I invite you to send your direct feedback and suggestions to the eReadiness team.

Notes:

- The VWCV **e-Mobility Guide** is an encyclopaedia, designed to act as a reference for in-house employees, dealerships and importers.
- It is made up of **core charts** and a final **summary** for each chapter.
- The VWCV e-Mobility Guide will keep you **up-to-date** at all times and will be updated on a regular basis.

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The eReadiness Team in Product Marketing at VWCV...

... is on hand to provide you with advice at any time so that we can reach our shared goal of completing the transition to electric mobility and making our customers' lives easier, more sustainable and more successful.

The new team's core focus areas are the provision and expansion of the charging ecosystem, and the provision of advice on electric mobility (e-consultancy). Orchestrating cross-divisional issues, including in training and marketing, and cross-over functions related to sustainability are further elements in the portfolio of tasks for the holistic eReadiness project @ VWCV.

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B2B Charging Infrastructure

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We are also available to answer direct queries related to the issue of electric mobility under our e-mail address: ereadiness.vwag.r.han@volkswagen.de!

eReadiness @ Volkswagen Commercial Vehicles consolidates all important sub-sections of electric mobility, putting the spotlight on customer needs

Charging ecosystem

@Home – ID. Charger and Volkswagen Naturstrom

@Work – Charging solutions for businesses and fleets

@Public – Find, charge and pay across Europe

@Highway – Quick-charging stations along all key transport axes

Product portfolio

Electric vehicles for almost all areas of use

e-Consultancy

Our consultancy concepts are based on customer needs and take into account all relevant issues related to electric mobility

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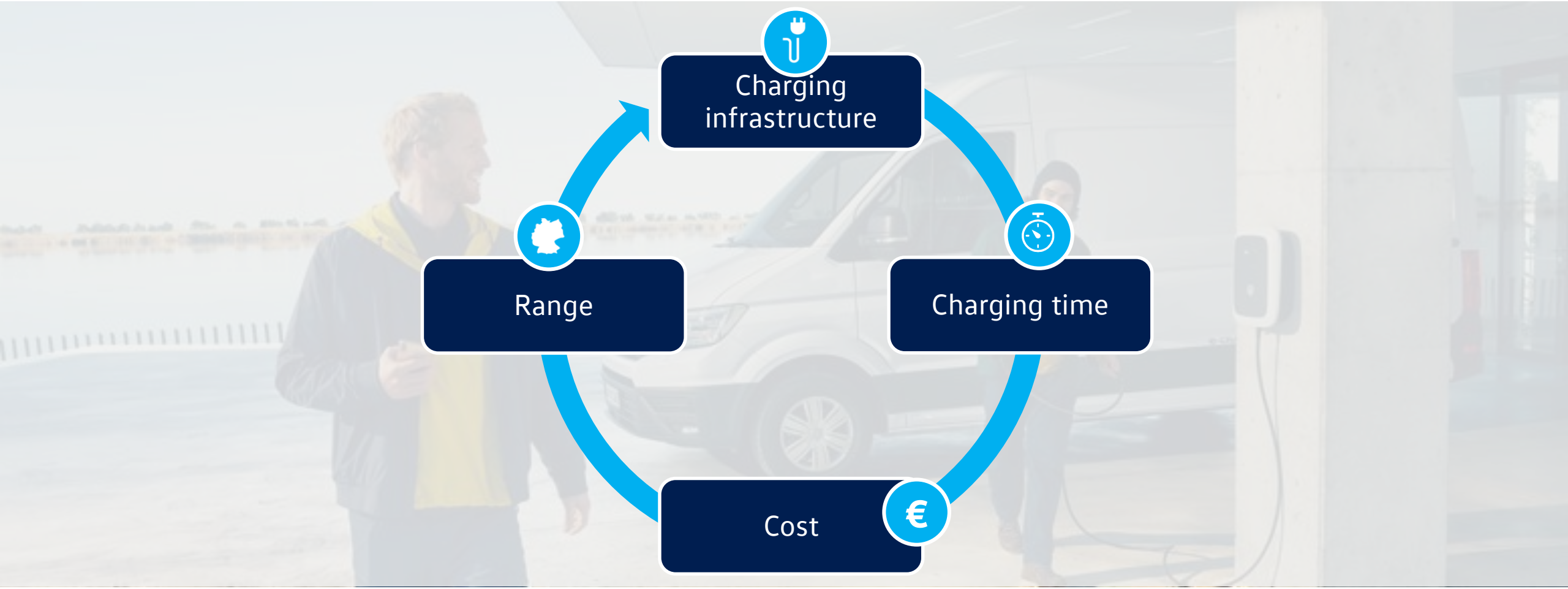
Primary customer needs related to electric mobility

With our electric vehicles and the appropriate charging ecosystem, we address these requirements in a holistic manner and break down our customers' reservations



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01 Challenge and strategy

1.1 Sustainability strategy

1.2 goTOzero environmental mission statement

1.3 Overarching Group strategy

02 VW Commercial Vehicles e-vehicle portfolio

2.1 e-vehicle portfolio

2.2 Financial assistance and costs

2.3 Safety | Questions and answers

03 Charging

3.1 Basic information on charging

3.2 Charging types, connectors and cables

3.3 Length of the charging process

04 Charging infrastructure

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4.2 @Work

4.3 @Public

4.4 @Highway

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01

Challenge and strategy

1.1 Sustainability strategy

1.2 goTOzero environmental mission statement

1.3 Overarching Group strategy

INSTRUCTIONS

The **interactive agenda** is designed to improve navigation in the VWCV e-Mobility Guide.
In the agenda, you can click to select both the **main chapters 01 to 04** and the **respective sub-chapters**.

1. You can use the "**to the Start of the chapter**" button to go to the start of the selected main chapter.
2. The "**to the Agenda**" button takes you to an overview of all of the main chapters at the start of the VWCV e-Mobility Guide.
3. The **main chapters** can be reached via the **arrows**.
4. The **sub-chapters** can be reached via the respective **sub-lines**.

VW Commercial Vehicles e-Mobility Guide

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We understand sustainability as a fundamental mindset based around acting with responsibility because...

"We are rising to global challenges.

We want to make an active contribution by passing on ***the same basis for living and working*** *to future generations while also* ***ensuring our own future viability."***

Volkswagen Commercial Vehicles' Vision for Sustainability

VW Commercial Vehicles e-Mobility Guide

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With our goTOzero environmental mission statement, we are setting ourselves ambitious goals in an effort to combat global challenges.

Climate change

Resources

Air quality

Environmental compliance

go TO zero

For all of our products and mobility solutions, we are striving to minimise environmental impact along their entire life cycle, from the extraction of raw materials to the end of service life in order to preserve ecosystems and have a positive impact on society.

Compliance with environmental regulations, standards and voluntary commitments is a basic prerequisite for our actions.

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With our goTOzero environmental mission statement, we are setting ourselves ambitious goals in an effort to combat global challenges.

Climate change

Resources

Air quality

Environmental compliance

We are committed to adhering to the Paris Agreement for climate action.
Our goal is to become carbon-neutral by 2050.

By 2025, we are aiming for a 30% reduction in greenhouse gas emissions from passenger cars and light commercial vehicles over their entire life cycle compared to 2015 values.
We are actively contributing to the transition to renewable energies across the vehicle's entire life cycle.

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The Volkswagen Group is rising to the global challenge of human-made climate change

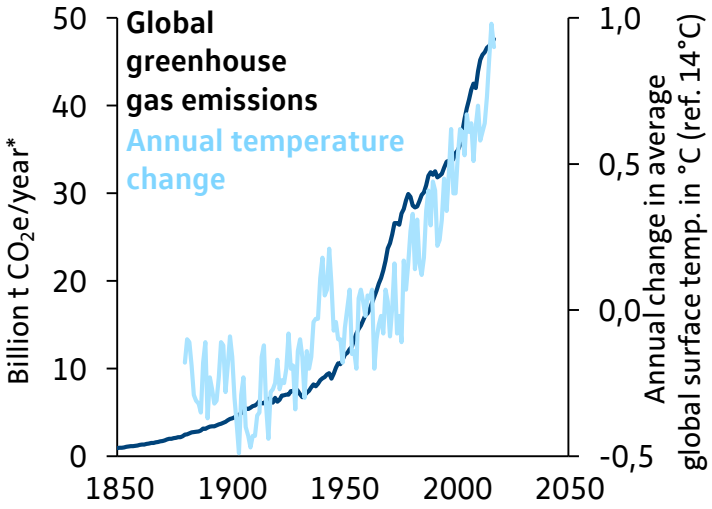
Global greenhouse gas emissions* have sky-rocketed since 1850; this has gone hand-in-hand with an ongoing rise in the global surface temperature since the early 20th century.

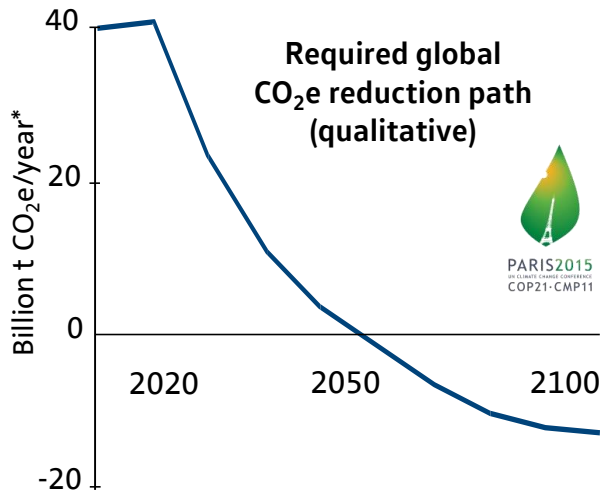
At the 2015 UN Climate Conference, participants agreed to stop this trend and limit the rise in the **average global temperature** to **below 2°C** compared to pre-industrial values by 2100. This will require a **huge reduction in greenhouse gases by 2050**.

The Volkswagen Group is committed to the resolution passed by the UN Climate Conference and is implementing the **2°C goal** based on recognised scientific methods.

Volkswagen recognises its responsibility in advancing decarbonisation.

Our aim is to become carbon-neutral in all four phases**.





2°C target

1. Supply chain
2. Production
3. Use
4. Recycling

*Greenhouse gas emissions is a collective term for emissions containing substances including carbon dioxide (CO_2), methane, laughing gas, and many more. These are referred to as **CO_2 equivalents** as they contain more than just CO_2, even though CO_2 makes up the largest proportion of greenhouse gas emissions. For short, CO_2 equivalents are known as **CO_2e**;
Left-hand figure: Own images containing data from Climatewatch and GISTEMP (global greenhouse gas emissions without consideration of emissions from land use, land-use changes and forestry); right-hand figure: Image taken from the talk "Group sustainability and decarbonisation programme […]", S. Krinke, 5 March 2020, Bochum

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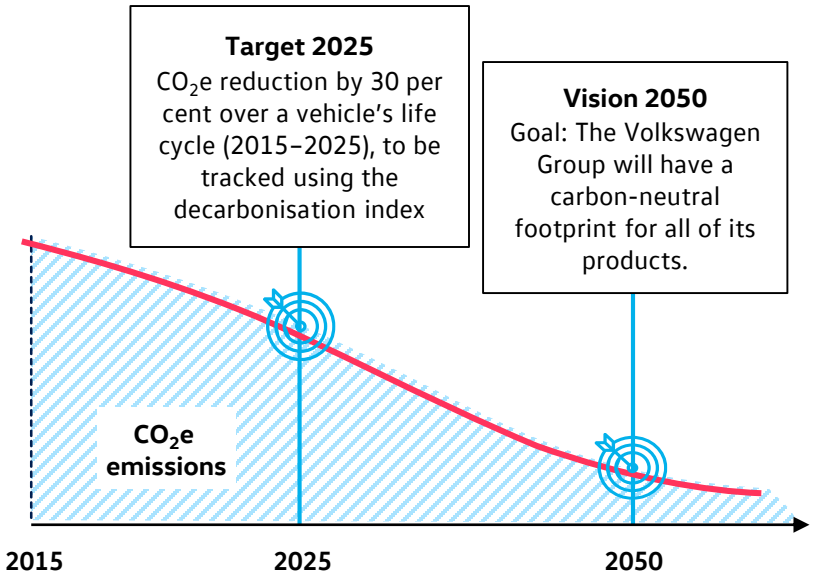
Decarbonisation is the Volkswagen Group's response to climate change and part of the "goTOzero" environmental mission statement

Dr. Diess

"The **Paris Agreement** is the benchmark for our actions and we are fully committed to the **objective of keeping global warming to less than 2° by 2050**. To achieve this,
we have approved an **extensive decarbonisation programme**."

Volkswagen Group annual media conference 2019

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21·CMP11



Key figures from the Volkswagen Group decarbonisation programme

- **Carbon-neutral** company by **2050**
- Reduction in vehicles' **CO_2e footprint** by **30% by 2025** (reference year 2015)
- **Decarbonisation index (DCI):** Measurement variable for translation into operations and internal management in tonnes of CO_2 equivalents per vehicle (CO_2e per vehicle)
- The DCI accounts for all greenhouse gas emissions created during the **vehicle life cycle**

The decarbonisation programme details Volkswagen's activities in the "Climate change" category of the "goTOzero" environmental mission statement.

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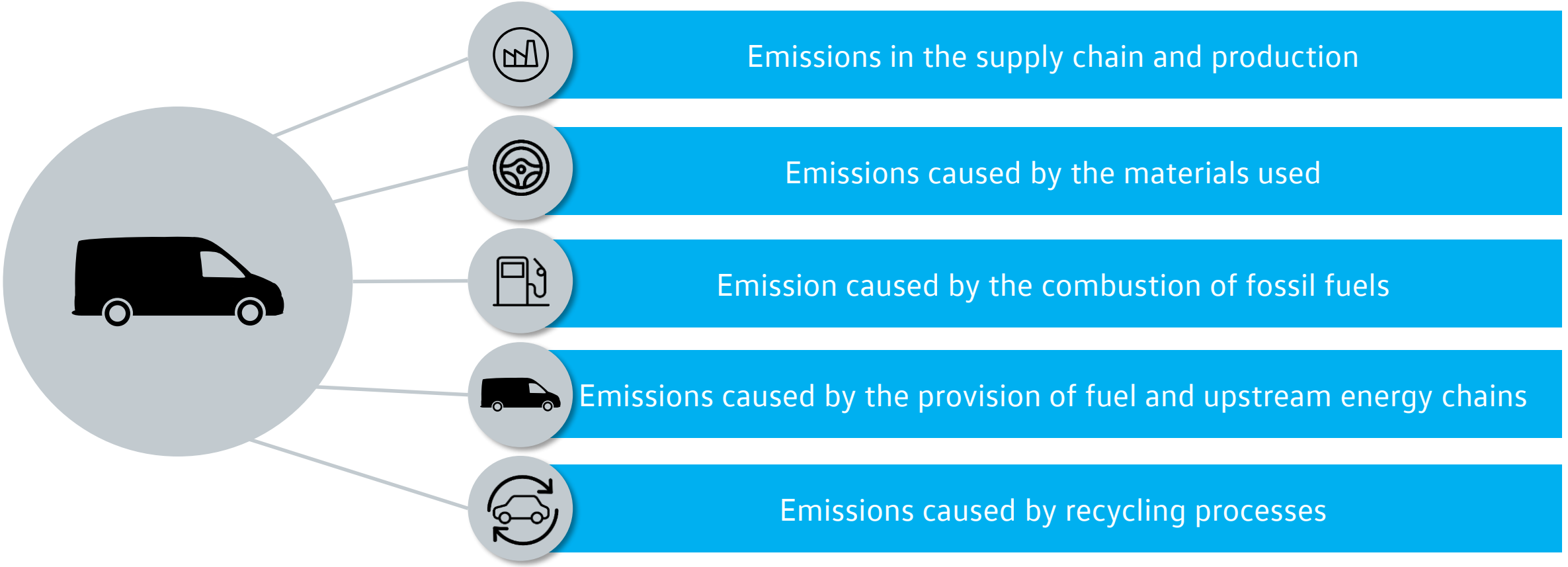
CO_2e emissions are created throughout a vehicle's entire life cycle and are not dependent on the specific drive system



These always relate to limited and non-limited emissions:

Non-limited emissions: Toxic substances without legal limits on their emissions level.

Limited emissions: Toxic substances with legal limits on their emissions level.

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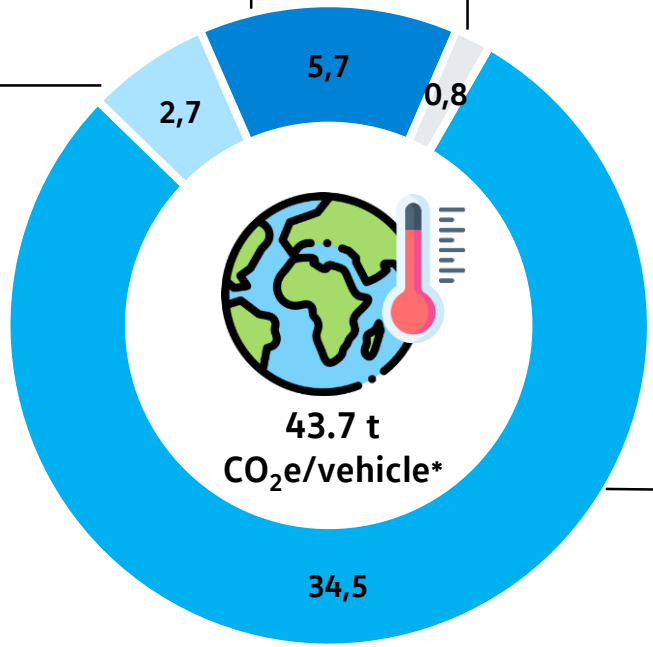
In 2019, the average total emissions from all vehicles sold by the Volkswagen Group was 43.7 t CO_2 equivalents

Supply chain = 5.7 t CO_2e

The range of materials, the increasing degree of electrification and the number of vehicles are leading to rising emissions.

End-of-life and others = 2.71 t CO_2e

Even now, the clear separation of materials poses a challenge, which is only exacerbated by electrification.



*Cars and light commercial vehicles

Production = 0.8 t CO_2e

Significant energy consumers:

- Press shop
- Body building

Usage over 200,000 km = 34.5 t CO_2e

At present, vehicles with conventional drive systems are the cause of high emissions.

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Due to the reduction measures in production, the compensation applied for the remaining emissions, and green energy, the ID.3 is carbon-neutral

METHODOLOGY

2020 drive systems – Assumptions

Vehicle base

- Golf 8 and ID.3: Production, use 200,000 km
- Most representative engine-gearbox combination and standard equipment
- Maintenance: Derived on a flat-rate basis
- ID.3 (1st Edition) Range: 440 km

Fuel and upstream energy chains (Well-to-Tank)

- EU fuels
- Energy mix EU-27

Consumption data (Tank-to-Wheel)

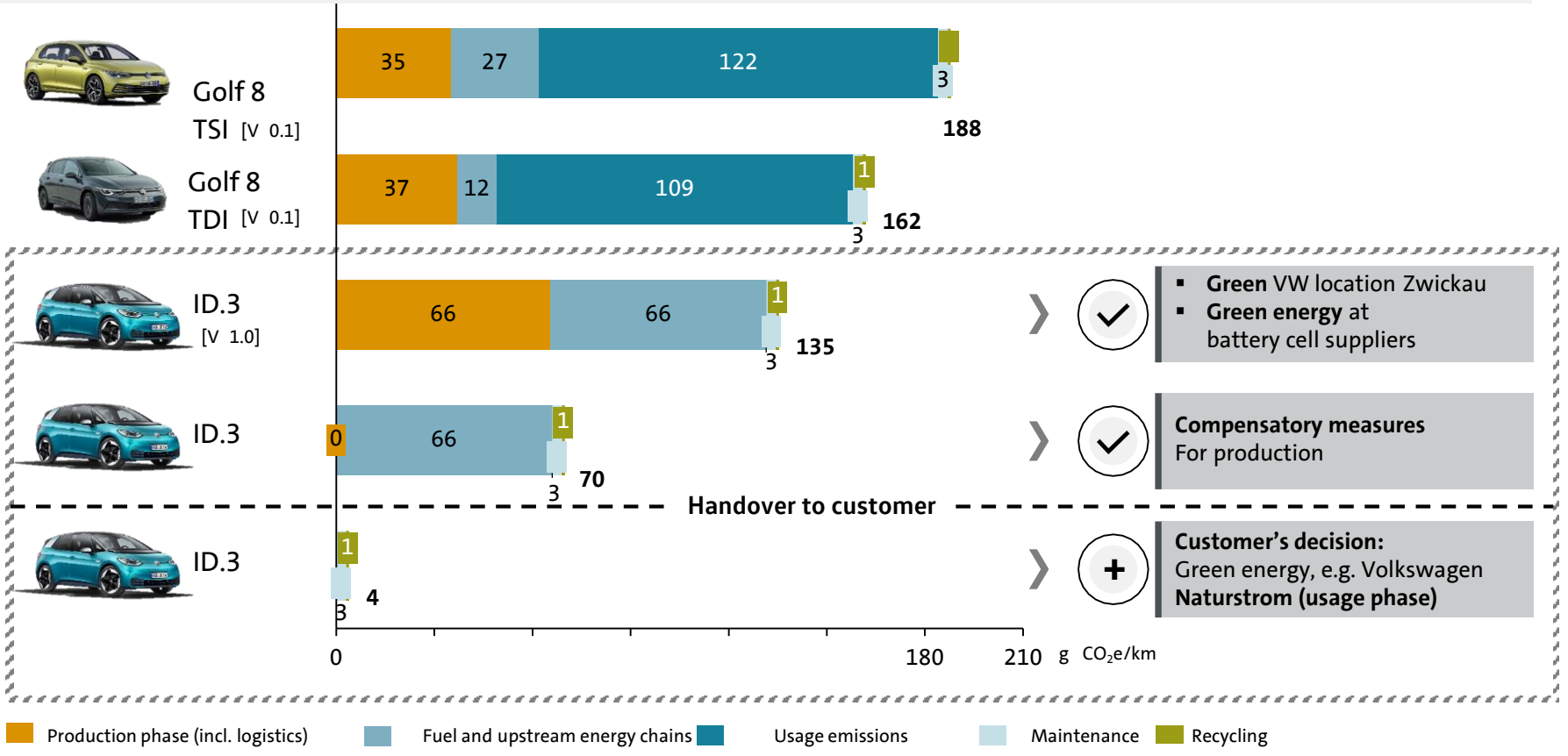
- WLTP

BEV

- 62 kWh NMC 622 lithium-ion battery, one battery over the entire service life

The Golf and ID.3 have similar equipment and power levels.

COMPARISON OF TECHNOLOGY



DECARBONISATION measures

- **Green** VW location Zwickau
- **Green energy** at battery cell suppliers

Compensatory measures
For production

Customer's decision:
Green energy, e.g. Volkswagen **Naturstrom (usage phase)**

Diagram data version: V 0.1 = LCA forecast value, V 1.0 = certified value

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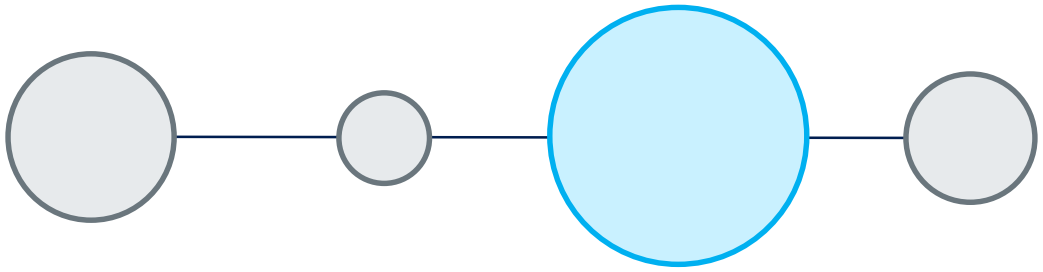
Like the ID.3, the goal for the ID. BUZZ is to hand the vehicle over to the customer with a carbon-neutral footprint; and with green energy, it can also be used in a carbon neutral manner.

ID. BUZZ

ID. BUZZ Cargo



Goal: 100% green energy over the entire life cycle. For users, the Volkswagen Group offers sustainable charging solutions, e.g. Volkswagen Naturstrom.

- The ID. BUZZ is due to be produced as the world's first Volkswagen Commercial Vehicle with a carbon-neutral footprint, which means it will be handed over to customers without any "CO_2 baggage".
- The energy-intensive battery cell production process for the ID. BUZZ is planned to be run exclusively on green power.
- Any emissions from the entire production process for the future ID. BUZZ that cannot be prevented at this time are due to be offset with the support of certified climate protection projects.

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With our goTOzero environmental mission statement, we are setting ourselves ambitious goals in an effort to combat global challenges.

- **Climate change**
- **Resources**
- **Air quality**
- **Environmental compliance**

go TO zero

We plan to maximise our resource efficiency and promote a closed-loop economy approach in relation to materials, energy and water.

By 2025, we plan to have reduced production-related environmental externalities (CO_2, energy, water, solid waste, volatile organic compounds) by 50% per vehicle compared to 2010

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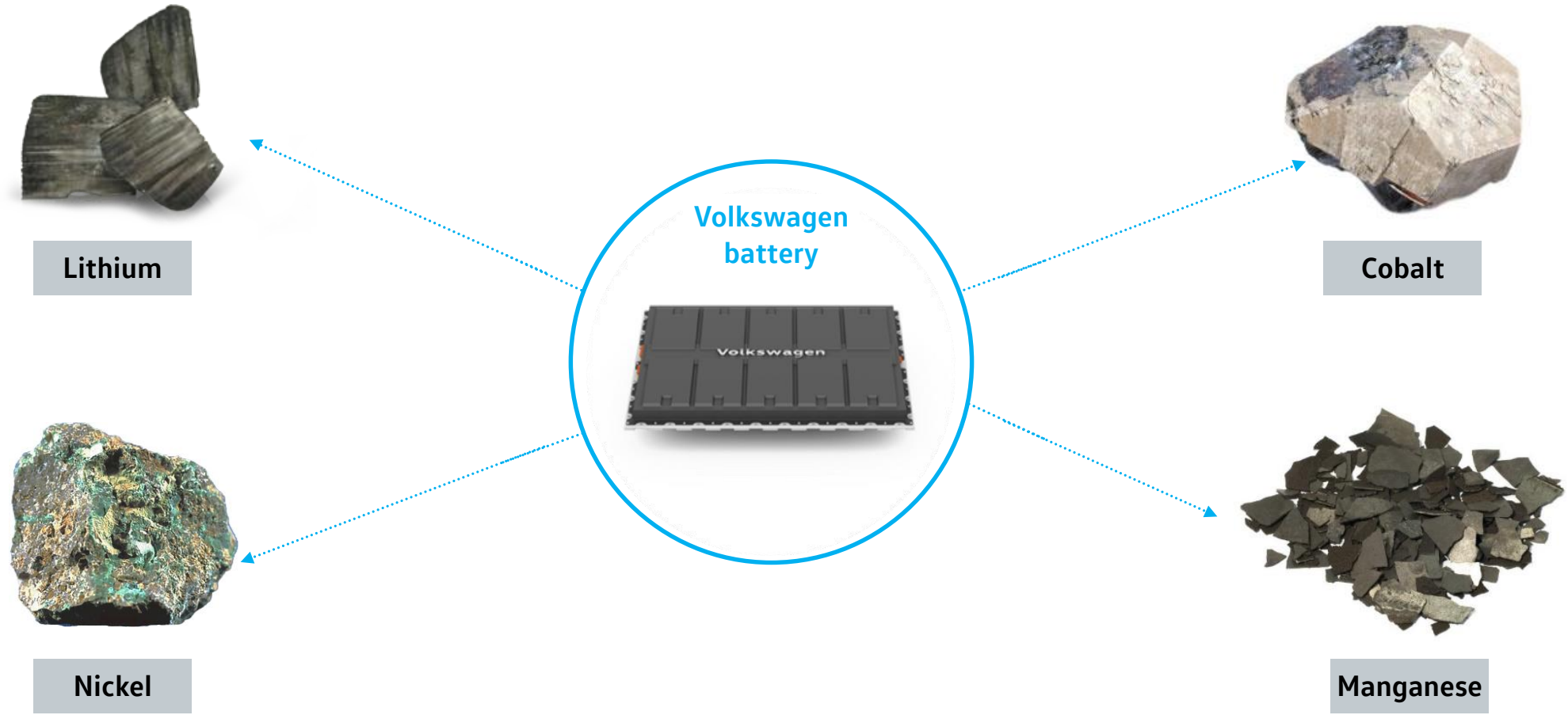
Volkswagen batteries for e-vehicles are made of lithium, cobalt, nickel and manganese



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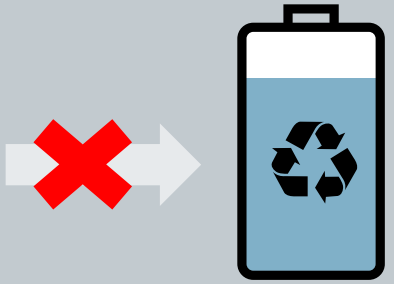
Conflict commodities and rare earths?

Conflict commodities

- Tin ore
- Coltan
- Gold
- Wolframite
- Diamonds
- Exotic woods
- Rubber
- Cocoa
- Cotton

Rare earths

- Scandium
- Yttrium
- Lanthanum
- Cerium
- Dysprosium
- Europium
- Erbium
- Gadolinium
- Holmium
- Lutetium
- Neodymium
- Praseodymium
- Promethium
- Samarium
- Terbium
- Thulium
- Ytterbium



None of the materials in this list **are found in Volkswagen batteries!**

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Conflict commodities and rare earths?

Requirements
Contractually required

- Environmental protection
- Employee rights
- Transparent business relationships
- Fair market behaviour
- Avoidance of blood minerals
- Avoidance of child labour
- Avoidance of illegal employment conditions

Requirements
Assessment of compliance with requirements

- Self-assessment on the topic of sustainability
- App for supplier sustainability assessments
- Supplier audits

Training
Raising of awareness among buyers & suppliers

- eLearning for suppliers and buyers
- In-person training courses for suppliers and buyers

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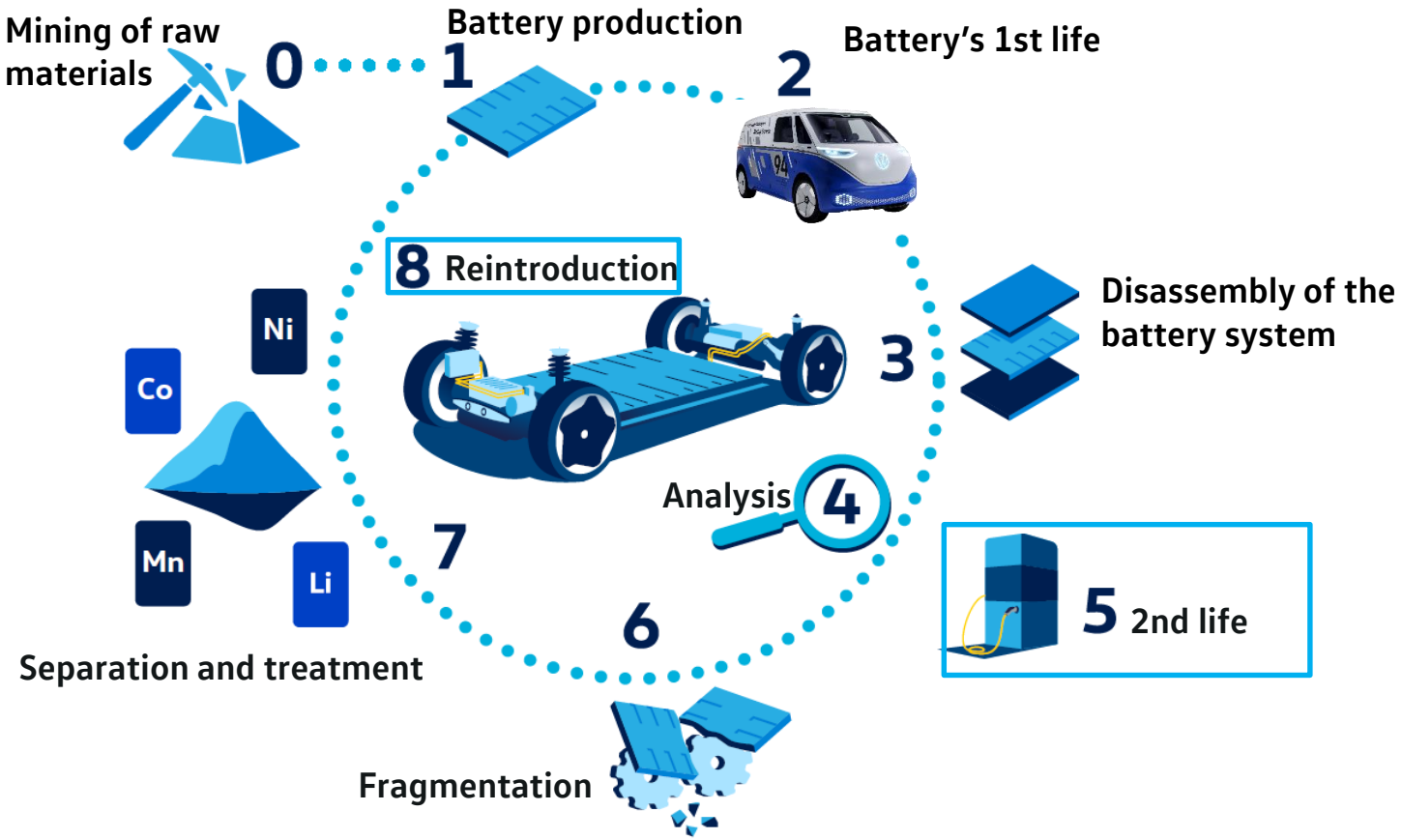
Closed battery cycle
Use of batteries, even after the end-of-life



0 Raw material mining / **1** Battery production / **2** 1st life / **3** Disassembly of the battery system / **4** Analysis of battery modules
5 Further use of intact modules (2nd life) / **6** Fragmentation / **7** Separation and processing of the components
8 Reintroduction of the cathode materials nickel, cobalt, manganese and lithium into the production process

More recycling, less mining of raw materials

Minimisation of critical raw materials through to their complete avoidance in our products. We are therefore already engaging in research on the battery technologies of the future and, amongst other things, are working hard to significantly reduce the required amount of cobalt in the next 3-4 years.

We also want to meet the demand for raw materials and energy stores through an ever-increasing share of old batteries. Whether it be through the continued use of older, but intact batteries in a so-called "second life" – for example, in flexible quick-charging stations for festivals – or through the direct recycling of the raw materials contained therein.

More recycling  **Less mining of raw materials**

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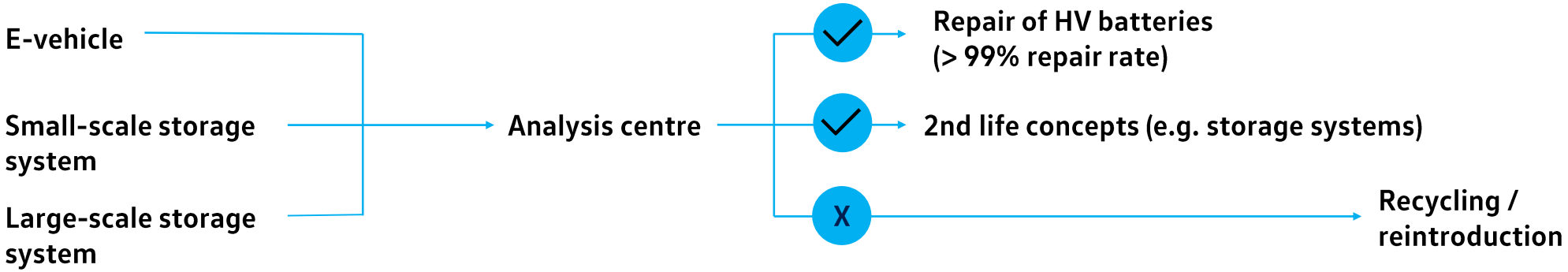
The two lives of high-voltage (HV) batteries | Second life and reintroduction into the battery cycle

After the HV battery has reached the end of its first life cycle,
it is analysed and can then be used for alternative purposes or recycled



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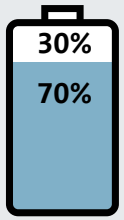
Service life of a battery

Charging behaviour, discharge depths and ambient temperatures are factors that influence a battery's service life

- **Service life:** In the case of rechargeable batteries, this is the period of time in which the battery can be used for a defined purpose
- **End of service life:** Storage capacity falls below the threshold defined for use.
  The battery is able to function and can be used for other purposes
- **Factors** that influence service life: charging behaviour, discharge depths, ambient temperatures, etc.



For electric vehicles, the end of the service life is generally reached when around 30% of the capacity has been lost.

After this point, these batteries can be used for another purpose or recycled.

Volkswagen warranty: min. 70% residual capacity after 8 years and a maximum of 160,000 km*

* Within the scope of the application of the warranty and the conditions and specifications listed therein, Volkswagen guarantees the customer buying a brand new BEV with an electric drive that the usable net vehicle battery content in this vehicle will not fall below 70% within eight years (or up to 160,000 kilometres driven, whichever comes first) as long as the vehicle is used correctly

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With our goTOzero environmental mission statement, we are setting ourselves ambitious goals in an effort to combat global challenges.

Climate change

Resources

Air quality

Environmental compliance

We are pushing electric mobility so that we can improve local air quality.

By 2025, the proportion of battery electric vehicles in the model portfolio will reach between 20 and 25%. The e-share of our new car fleet in Europe and China is due to increase to at least 40% by 2030.

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With our goTOzero environmental mission statement, we are setting ourselves ambitious goals in an effort to combat global challenges.

- **Climate change**
- **Resources**
- **Air quality**
- **Environmental compliance**

In terms of integrity, we want to set an example as a modern, transparent and successful company, by installing and monitoring effective management systems which address the environmental impacts of our mobility solutions across all stages of their life cycles.

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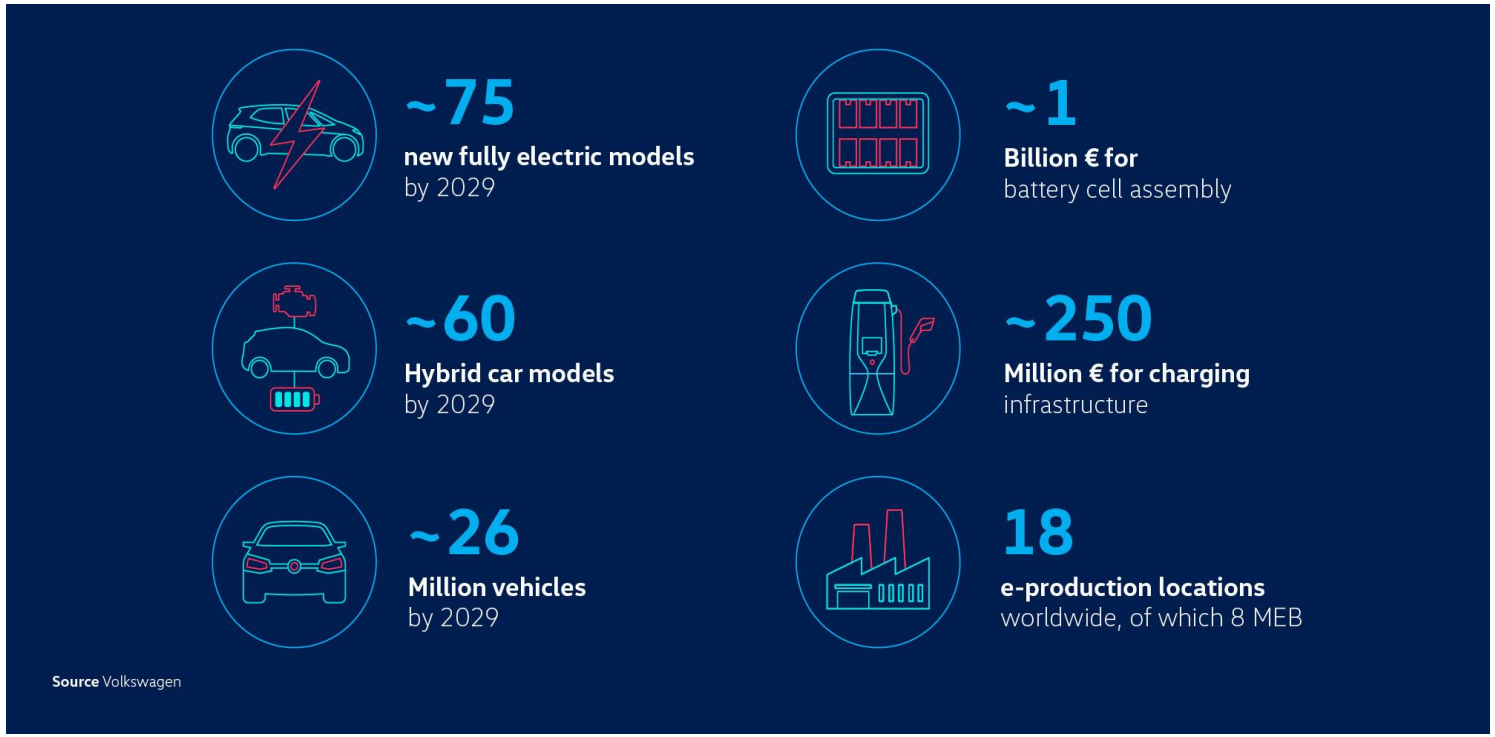
The biggest push for electrification in the global automotive industry – the heart of our strategy in the Volkswagen Group



Source: VW Newsroom

Volkswagen has a more consistent focus on **electrically powered vehicles** than any other automotive manufacturer.

The electric vehicle for everyone – this is the core of the electric campaign. By 2029, Volkswagen Group as a whole intends to have up to **75 fully electric models** on the market as well as around **60 hybrid vehicles.**

In total, the Group intends to sell around **26 million electric vehicles** by this point and thereby help electric mobility achieve a global breakthrough. Volkswagen will be investing around **EUR 33 billion** in electric mobility across the Group by 2023.

The joint ventures in China will be investing a further **EUR 15 billion** for the same purpose over the coming years.

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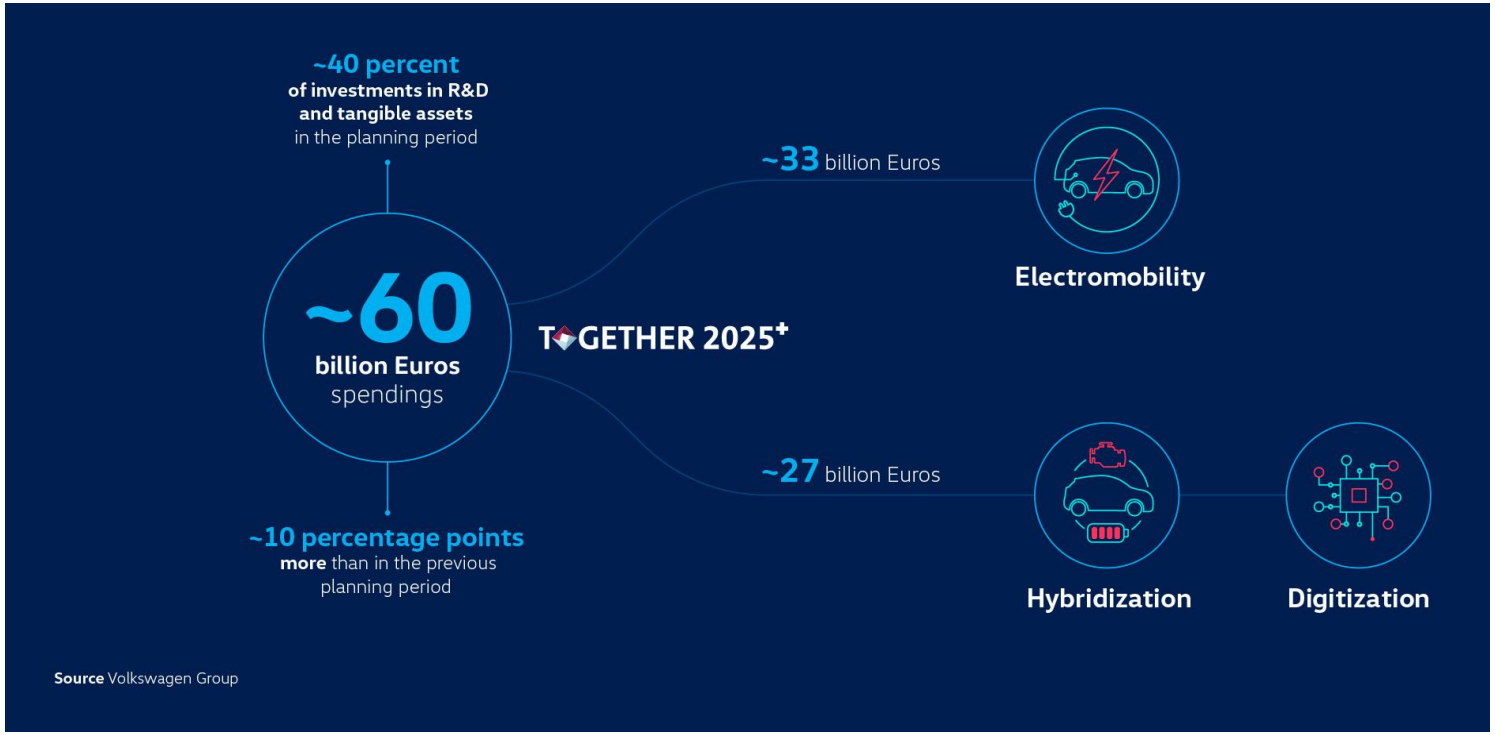
The Volkswagen Group strategy TOGETHER 2025+ is investing in the future – hybridisation, electric mobility & digitalisation



Source: VW Newsroom

The Group vision is:

"Shaping mobility – for generations to come."

Volkswagen is investing EUR 60 billion in the Together 2025+ strategy – that's 10% more than in the last planning round.

The heart of electric campaign ("The electric car for everyone") is complemented by **high investments in hybridisation and digitalisation**.

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MEB at 8 locations on 3 continents by 2022
This is how Volkswagen is expanding electric mobility on a Group-wide basis

Source: VW Newsroom

Zwickau is the first site to be completely converted to electric mobility – from 2021, up to **330,000 electric cars per year** will roll off the production line there.

The plants in Emden, Hanover and Dresden will also manufacture electric vehicles in the future.

Other locations are Mlada Boleslav, Anting/Shanghai and Foshan in China as well as Chattanooga in the USA.

In total, Volkswagen will therefore have **eight factories for producing MEB vehicles by 2022**.

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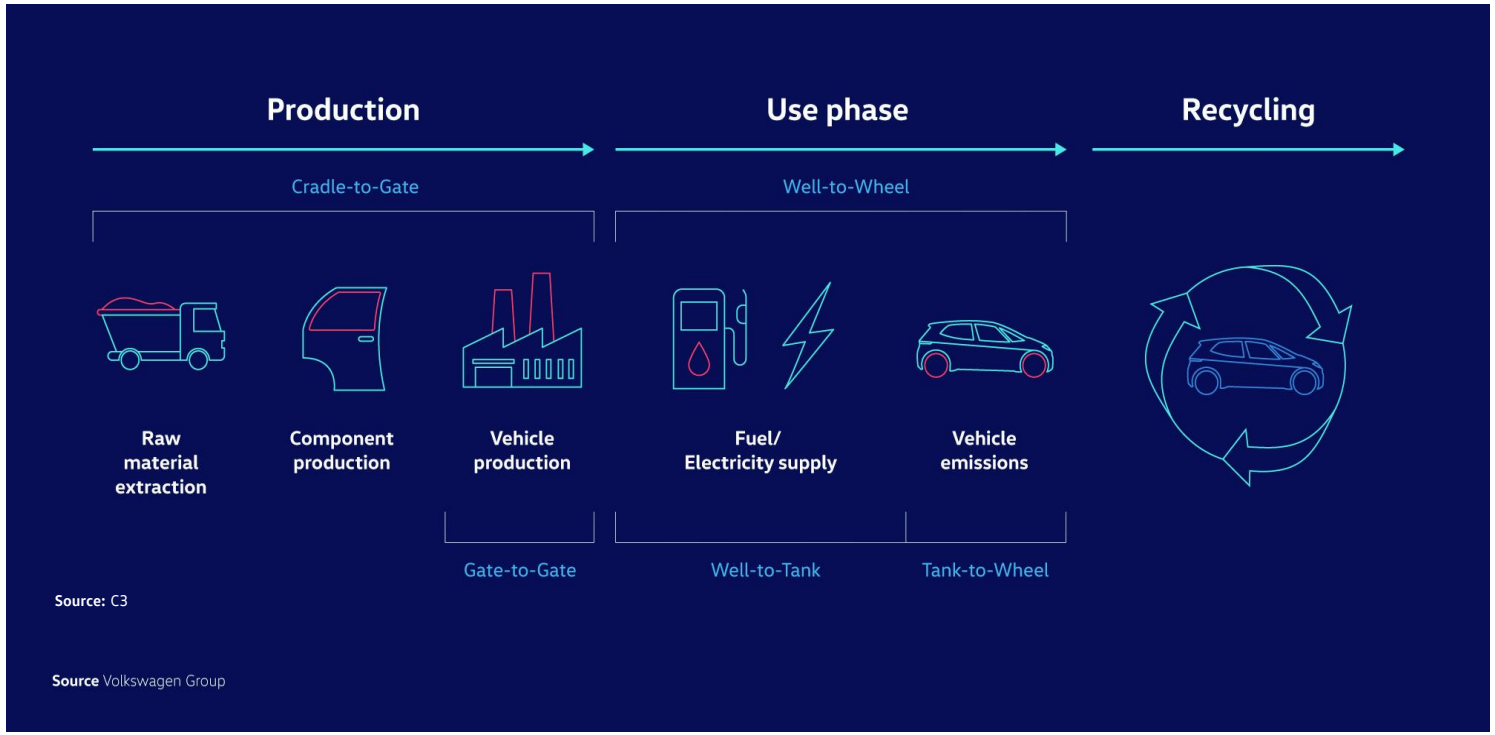
A vehicle's environmental footprint is assessed by an independent expert based on an ISO process, covering the entire life cycle



Volkswagen does not simply build electric vehicles, it also studies them closely over their entire life cycles, from the raw materials
to recycling – as part of something known as the product life cycle assessment (LCA).

For this analysis, the life of a vehicle is first divided into three phases: production, the usage phase and recycling.

The production phase has three sub-categories in which data
is recorded: production of raw materials, component production and vehicle production.

The usage phase is split into the provision of fuel/ energy and vehicle emissions.

Naturally, recycling is also a major issue at Volkswagen, for instance regarding the second use of batteries or the processing and reuse of valuable materials.

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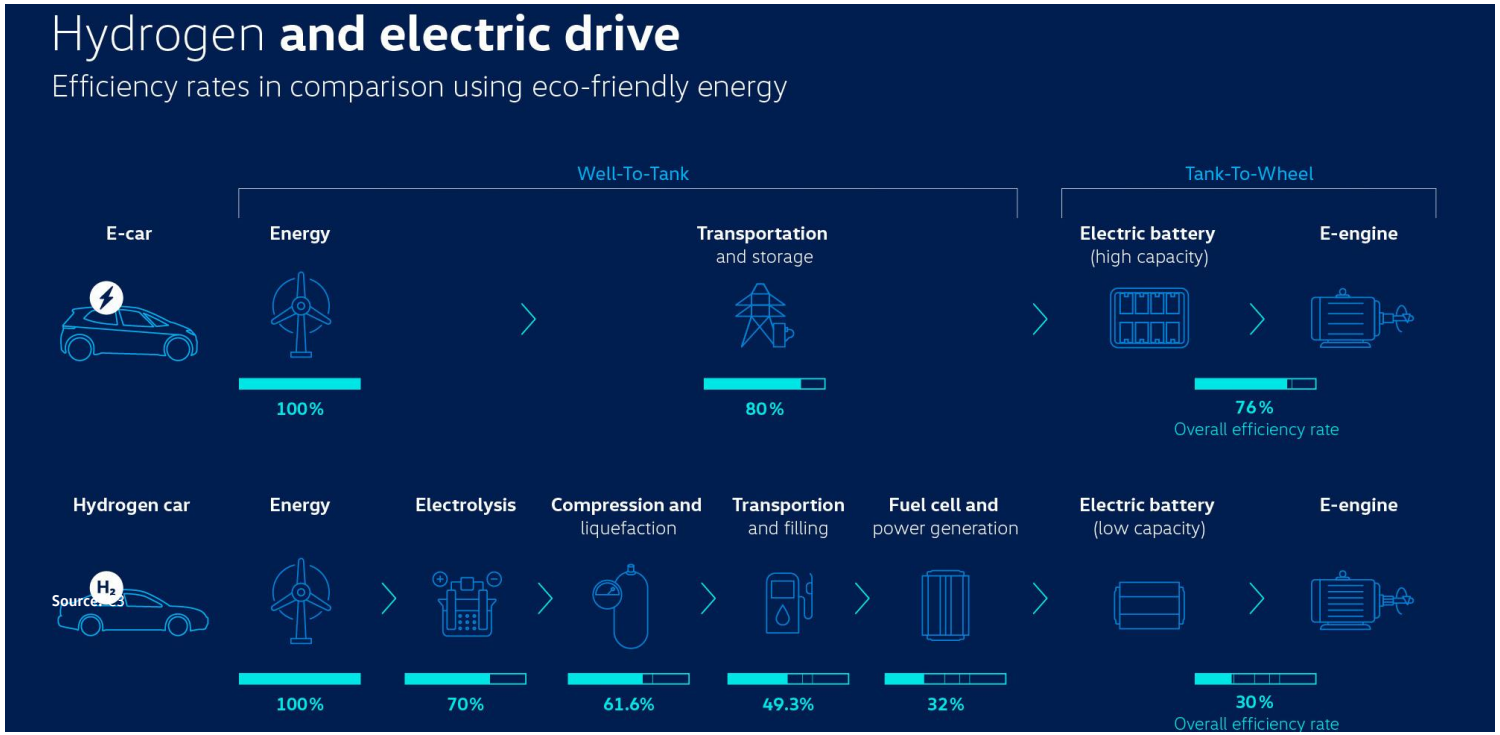
Why is Volkswagen focusing so much on electric mobility

BEV vs. FCEV: Electric vehicles with much better use of primary energy



Source: VW Newsroom

Electric mobility is the best and fastest known way to reduce CO_2 efficiently.

Hydrogen definitely has its strengths (range, quick refuelling, no heavy battery on board) and may be a sensible addition to the portfolio for some applications in the long term (e.g. C/D TRP segment over long distances)**.**

However, hydrogen has one significant disadvantage: **it is comparatively inefficient when it comes to converting renewable primary energy into usable energy for drive.** Correspondingly, 2-3 times the number of "wind turbines" would be needed for hydrogen-powered cars in comparison to electric vehicles.

Furthermore, hydrogen is currently **not ready for the high volume market**; one problem is the **lack** of **suitable infrastructure** for usage.

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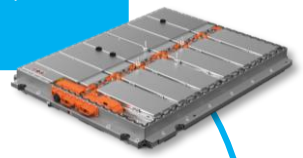
Various alternative drive technologies contribute to the reduction of CO_2 in the transport sector

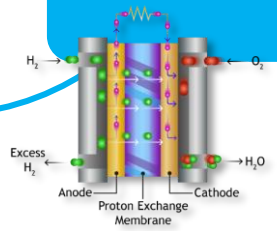
Even now, purely electric vehicles can cover a large proportion of customer requirements and are currently the most economical alternative thanks to their high degree of efficiency.

Battery
(BEV)



reFuels
(ICE)

Hydrogen
(FCEV)



The point where electric mobility meets its limitations is where hydrogen drives may make sense: heavy commercial vehicles, cooling chains or short stationary periods.

In areas where neither battery-powered electric vehicles nor hydrogen can be used, the use of reFuels for classic combustion engines presents an option for reducing carbon emissions.

This e-Mobility Guide aims to focus on purely battery-powered electric vehicles as, even today, a large proportion of all customers will be able to manage their day-to-day journeys over ever longer ranges without any compromises. Nevertheless, Volkswagen Commercial Vehicles is open to technologies like hydrogen drives and reFuels, though we know that we are pushing forward with our transformation using the technology that reaches climate objectives in the most reliable, sustainable and economic manner possible.

Commercial Vehicles

Summary | Challenge & strategy

Volkswagen Commercial Vehicles' sustainability strategy is its response to global challenges. Electric mobility is essential in fighting the challenge of climate change.

As a response to climate change, the Volkswagen Group has set out a decarbonisation programme to be completed by 2050.

- Goal for 2025: CO_2 reduction over the products' life cycle, in accordance with the Paris climate targets
- Vision for 2050: The Volkswagen Group will have a carbon-neutral footprint for all of its products

Electric mobility plays a fundamental role in achieving carbon neutrality.

- Even today, electric vehicles have an advantage over vehicles with conventional drives when it comes to CO_2.
- This CO_2 advantage can be extended, e.g. if the production process uses power from renewable sources. This and further measures are planned to ensure that the ID. BUZZ is handed over to customers with a carbon-neutral balance sheet.

VW Commercial Vehicles e-Mobility Guide

Commercial Vehicles

01 Challenge and strategy

- 1.1 Sustainability strategy
- 1.2 goTOzero environmental mission statement
- 1.3 Overarching Group strategy

02 VW Commercial Vehicles e-vehicle portfolio

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03 Charging

- 3.1 Basic information on charging
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- 3.3 Length of the charging process

04 Charging infrastructure

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- 4.2 @Work
- 4.3 @Public
- 4.4 @Highway

VWCV e-mobility for all segments
Overview of our electric vehicle portfolio

2018

e-Crafter

2020

ABT e-Transporter 6.1

ABT e-Caddy

2021

T7 PHEV

The mobility of tomorrow is what drives us

More information: Click here!

2022/23

ID. BUZZ Cargo

ID. BUZZ

Detailed product information on the e-Crafter on the following slides; binding product information on the remaining vehicle portfolio to be provided upon market entry.
Your Volkswagen Commercial Vehicles ABT e-dealership will provide you with a basic Volkswagen Commercial Vehicles model with a drive train created by our partner ABT e-Line.

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e-Crafter | Volkswagen Commercial Vehicles' first ever electric-only model

100% Crafter – 100% electric

The first purely electric model from Volkswagen Commercial Vehicles combines high payload and range with the best driving characteristics for inner city traffic.

Commercial Vehicles

e-Crafter | Technical specifications

- Electric 100 kW/136 bhp
- 290 Nm torque
- 35.8 kWh battery content (gross)
  31.7 kWh battery content (net)
- Vmax 90 km/h
- Up to 115 km range (WLTP)*
  Up to 160 km range (City WLTP)
- 29.1 kWh/100km consumption
  CO_2 emissions: 0 g/km; **efficiency class: A+**

* According to the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and in the most favourable equipment line of the e-Crafter in terms of range with 31.7 kWh net battery power content: 29.1 kWh/100 km, CO2 emissions: 0 g/km; efficiency class: A+. The electric range was determined on the rolling road test bed. The actual WLTP range values may deviate depending on the equipment fitted. The actual range achieved under real conditions varies according to driving style, speed, use of comfort features and auxiliary equipment, ambient temperature, number of passengers/load, and topography.

Commercial Vehicles

e-Crafter | Charging | Loading

- **AC “SchuKo” approx. 2.3 kW**
  approx. 17 h*
- **AC “ID. Charger” approx. 7.2 kW**
  approx. 5 h 20 min*
- **DC “CCS” approx. 40 kW**
  approx. 45 min* (80%)

- Payload: **982 kg**
- Load volume up to **10.7m³**
- Load compartment **3,450 x 1,832 x 1,861 mm**

* Charging cycle from 0% to 100%. Except for CCS charging, from 0% to 80%

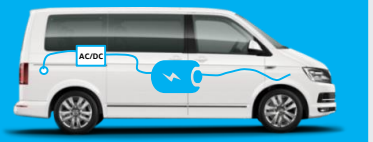
Commercial Vehicles

Cooperation between Volkswagen Commercial Vehicles and ABT e-Line GmbH

The cooperation focuses mainly on the
ABT e-Transporter 6.1 and ABT e-Caravelle 6.1

Basic vehicle from VWCV

Drive train from ABT e-Line GmbH



In the electrification project between Volkswagen Commercial Vehicles and ABT e-Line GmbH, Volkswagen Commercial Vehicles is developing the basic vehicle. ABT e-Line GmbH is responsible for the electrification aspect and the corresponding drive train.

* According to the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and in the most favourable equipment line of the ABT e-Caravelle 6.1 in terms of range with 32.5 kWh net battery power content: 28.3 kWh/100 km, CO2 emissions: 0 g/km; efficiency class: A+.
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Commercial Vehicles

ABT e-Transporter 6.1 and ABT e-Caravelle 6.1
“A reliable all-rounder”

The T6.1, a reliable all-rounder, a VW van for our business and commercial customers, for the new electric and digital world. With its range of new assist systems combined with a high payload and exceptional comfort, its inner values shine through.

The ABT e-Transporter 6.1 with a long wheelbase developed by our premium partner ABT e-Line offers a full load compartment volume of up to 6.7 m^3. As a result, it is ideal for a professional refit with a universal floor and complete shelving or workshop system. As a Kombi or Caravelle, the converted vehicle can transport people over distances of approx. 134 km*.

* According to the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and in the most favourable equipment line of the ABT e-Caravelle 6.1 in terms of range with 32.5 kWh net battery power content: 28.3 kWh/100 km, CO2 emissions: 0 g/km; efficiency class: A+.
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ABT e-Transporter 6.1 | Technical specifications

- Electric 83 kW/113 bhp
- 200 Nm torque
- 37.3 kWh battery content (gross)
  32.5 kWh battery content (net)
- Vmax 90 km/h (optional 120 km/h)
- N1: 90 km/h: 138 km range **144 km WLTP City range***
  N1: 120 km/h: 121 km range*
  and **143 km WLTP City range***
- N1: 90 km/h: 27 kWh/100 km consumption*
  N1: 120 km/h: 31.1 kWh/100 km consumption
- CO_2 emissions: 0 g/km
  Efficiency class: A+

* According to the Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and in the most favourable equipment line of the ABT e-Transporter 6.1 in terms of range with 32.5 kWh net battery power content: 31.1 -27.0 kWh/100 km, CO2 emissions: 0 g/km; efficiency class: A+.
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Commercial Vehicles

ABT e-Transporter 6.1 | Charging | Loading

- **AC “SchuKo” 2.3 kW**
  approx. 16 h*
- **AC “ID. Charger” 7.2 kW**
  approx. 5 h 30 min*
- **DC “CCS” 50 kW**
  approx. 45 min (80%)

- Payload: **977 kg (Kombi); 1,096 kg (Transporter)**
- Load volume up to **6.7m³**
- Maximum trailer weight:
  Unbraked: 750 kg;
  Braked: 1500 kg (N1), 1500 kg (M1)
- Load compartment: **2,724 x 1,700 x 1,410 mm**

* Charging cycle from 0% to 100%. Except for CCS charging, from 0% to 80%

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Commercial Vehicles

ABT e-Caravelle 6.1 | Technical specifications

- Electric 83 kW/113 bhp
- 200 Nm torque
- 37.3 kWh battery content (gross)
  32.5 kWh battery content (net)
- Vmax 90 km/h (optional 120 km/h)
- N1: 90 km/h: 134 km range and **140 km WLTP City range***
- N1: 120 km/h: 120 km range and **140 km WLTP City range***
- N1: 90 km/h: 28.3 kWh/100 km consumption*
  N1: 120 km/h: 31.9 kWh/100 km consumption*
- CO_2 emissions: 0 g/km
  Efficiency class: A+

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Commercial Vehicles

ABT e-Caravelle 6.1 | Charging | Loading

- **AC “SchuKo” 2.3 kW**
  approx. 16 h*
- **AC “ID. Charger” 7.2 kW**
  approx. 5 h 30 min*
- **DC “CCS” 50 kW**
  approx. 45 min (80%)

- Payload: **977 kg**
- Luggage compartment volume: **up to 6.7m³**
- Maximum trailer weight:
  Unbraked: 750 kg;
  Braked: 1500 kg (N1), 1500 kg (M1)
- Load compartment: **2,724 x 1,700 x 1,410 mm**

* Charging cycle from 0% to 100%. Except for CCS charging, from 0% to 80%

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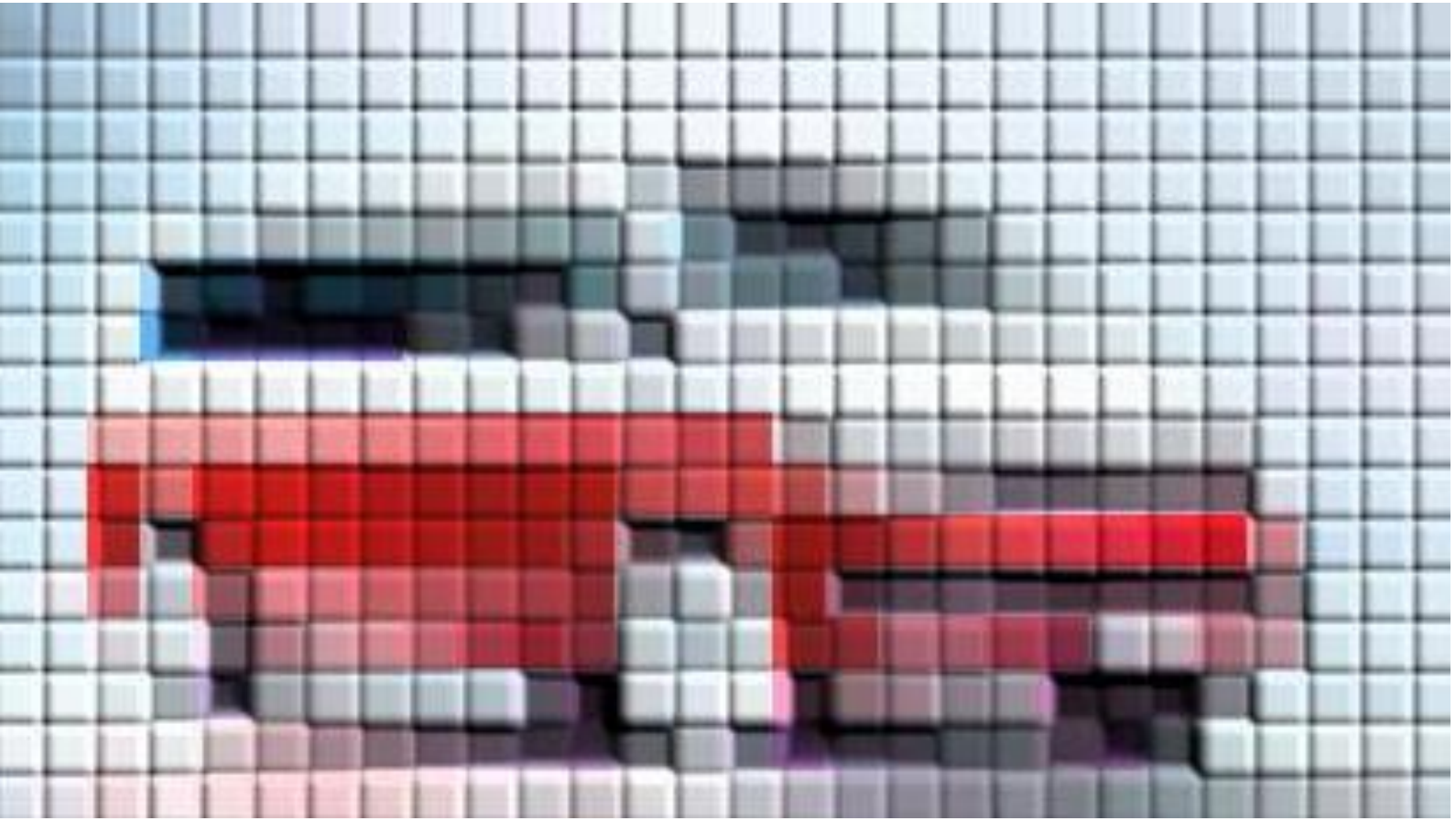
Commercial Vehicles

T7 | “From 2021, the new T7 – also available as PHEV”



From 2021, the new T7: An electrified version is available in the form of the optional plug-in hybrid, making it ideal for all customers looking for long ranges and electrified mobility. It will also be available as a petrol or diesel version, all-wheel drive, with a short or long wheelbase, as a left- or right-hand drive.

Commercial Vehicles

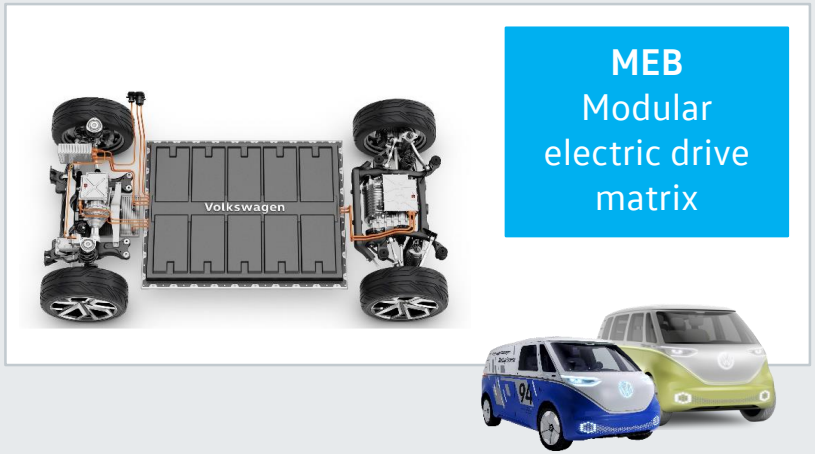
ID. BUZZ and ID. BUZZ Cargo | “Symbolising the future of the brand”

The ID. BUZZ and ID. BUZZ Cargo are due to arrive in 2022: Fully electric with zero emissions, they can transport passengers or goods. Thanks to the cutting-edge digital technology, they are set to serve as the future base for autonomous driving. All of this combined with a design reminiscent of our brand’s roots, the T1.

Symbolising the future of the brand: Extremely practical, extremely sensible and yet: extremely sexy!

Commercial Vehicles

MEB platform | The module electric matrix can be used to create a number of models with long ranges



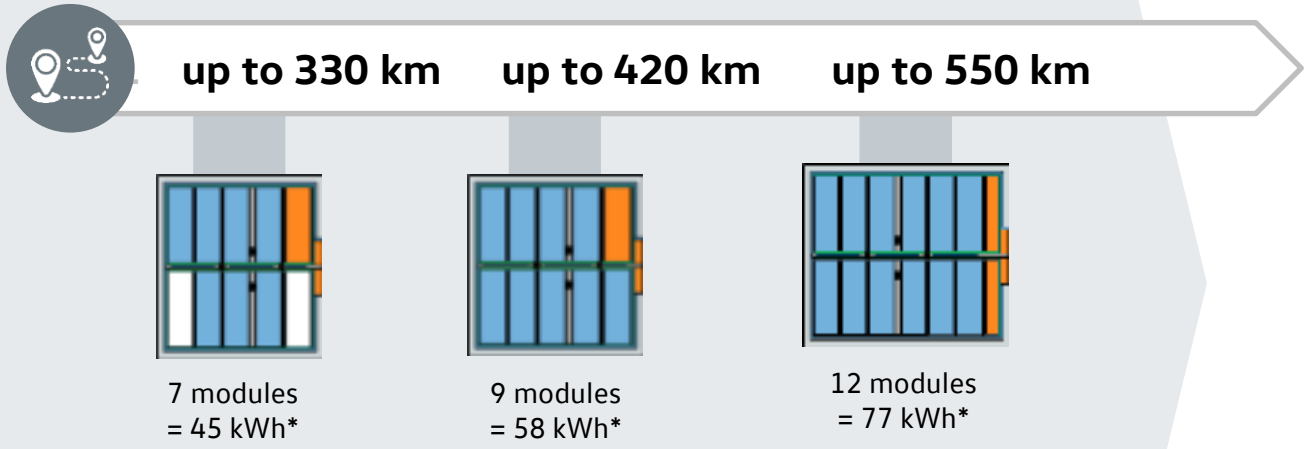
ID. BUZZ & ID. family are based on the MEB

- As a vehicle platform, the MEB is completely centred around BEV
- The ID. BUZZ passenger vehicle and commercial vehicle variants are the first vehicles in their segments to be **completely conceived and developed as BEV**
- Explicitly for the ID. Buzz, the **MEB has been adjusted to incorporate commercial-vehicle-specific requirements and properties**
- The complete alignment towards BEV allows for huge added value in terms of **range, space, vehicle dynamics and digital connectivity**
  - Ideal package: Longer wheelbase and shorter overhangs for improved loading dimensions in smaller areas
  - BEV-optimised weight management without consideration of "ICE old loads" for maximum payload and good driving dynamics
  - Perfectly suited for urban driving for private and commercial customers due to smaller turning circle and optimised road area
  - Cutting-edge assistance systems and online functionalities in passenger and commercial vehicles
  - Over-the-air updates save on time- and cost-intensive trips to the workshop, particularly for commercial customers

Commercial Vehicles

MEB platform – The modular electric matrix allows for a range of battery sizes and ranges – with warranty conditions that are conventional for the industry

Battery sizes using the ID. 3 as an example



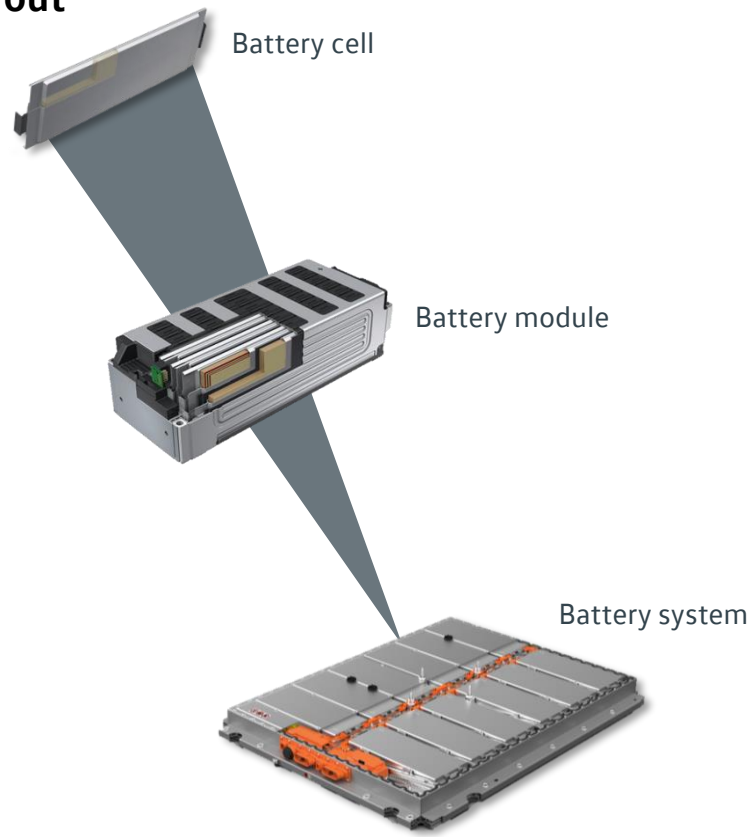
Warranty conditions**

Running time or
8 years

Vehicle performance
160,000 km

Residual battery capacity
70%

Battery layout



* Battery content (net)

** Within the scope of the application of the warranty and the conditions and specifications listed therein, Volkswagen guarantees the customer buying a brand new BEV vehicle with an electric drive that the usable net vehicle battery content in this vehicle will not fall below 70% within eight years (or up to 160,000 kilometres driven, whichever comes first) as long as the vehicle is used correctly.

Commercial Vehicles

e-Bike Cargo | Volkswagen Commercial Vehicles' e-Bike Cargo is due to launch in 2021

- Electric cargo bike for 250 kg GVWR*
- Allows for modular attachment and transport concepts
- Load compartment volume: 0.5 $m^{3\ max.}$
- Possible use of the load compartment
- Closed transport box (on the right of the picture)
- Workshop storage system

* GVWR: Gross vehicle weight rating

Commercial Vehicles

e-Bike Cargo | Technical specifications

- 250 W (36 V) max. motor power
- Approx. 4.5 h charging time to 100%
- 0.5 kWh battery capacity
- 25 km/h supported top speed
- 65 km max. range
- 0.5 m³ max. load compartment volume, load area is compatible with Eurobox

Commercial Vehicles

Summary | e-Vehicle portfolio

- **Volkswagen Commercial Vehicles is expanding its e-vehicle portfolio on an ongoing basis:**

	**e-Crafter**	since 2018, ideal solution for zero-emissions urban transportation
	**ABT e-Transporter 6.1**	from 2020, a cooperation with ABT e-Line*
	**T7**	from 2021, next generation of people carriers – with plug-in hybrid
	**ID. BUZZ**	from 2022, 100% BEV – Introduction to the ID. family at VWCV
	**e-Bike Cargo**	from 2021, electrical cargo bike (initially for the German market)

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VW Commercial Vehicles e-Mobility Guide

Commercial Vehicles

Example Germany

Government funding in Germany | There is a wide range of incentives and funding options available for electric vehicles*

Incentives	Description
Tax benefits on ownership	10-year exemption on vehicle tax for BEV and PHEV if the vehicle is purchased between 18 May 2011 and 31 December 2030
Company car/leasing	Reduction of the monetary benefit for BEV and PHEV from 1% to 0.25% (BEV) or to 0.5% for company cars with a gross list price of > EUR 60,000 (BEV or anPHEV)
Monetary incentives	Environmental bonus of EUR 9,000 for BEV, EUR 6,750 for PHEV (X < EUR 40,000)** Environmental bonus of EUR 7,500 for BEV, EUR 5,625 for PHEV (EUR 40,000 < X < EUR 65,000)**
One-off write-down	For electric delivery vehicles used for commercial purposes, a one-off write-down of 50% of the purchase costs is guaranteed on a one-time basis between 2020 and 2030

Electric vehicles are exempt from annual vehicle tax for a period of ten years from the day of registration.
The monetary incentives apply for all new vehicles registered from 4 November 2019 and used vehicles (< 12 months and < 15,000 km).
The environmental bonuses are financed by the government and industry.

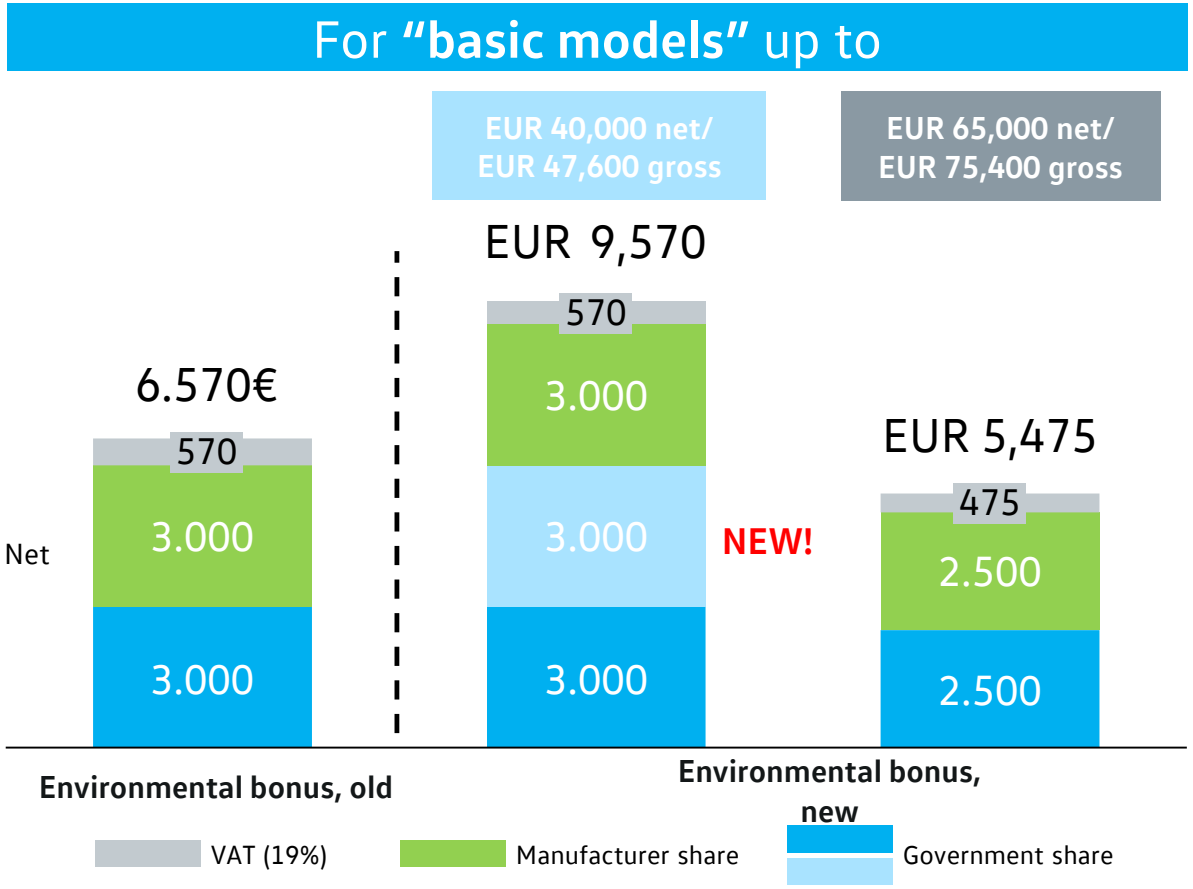
Source: Premium for electric vehicle funding, Federal Office for Economic Affairs and Export Control environmental bonus 2020. Premium limited until **31 December 2025** (all figures are listed as net). Furthermore, the 4th Summit of the Concerted Action on Mobility on 17 November resolved to extend the innovation premium – i.e. to the double the government share – by the end of 2025. The exact conditions are currently being developed.
BEV = Battery Electric Vehicle, PHEV = Plug-In-Hybrid Electric Vehicle
*Heavily simplified overview for informational purposes, no legal claim can be derived from this. Subject to change and errors.
**Depends on the net list price = X; only M1 vehicles are fully eligible for state funding according to the Federal Office for Economic Affairs and Export Control

Commercial Vehicles

Example Germany

Overview of the environmental bonus for e-vehicles in Germany

Government financial support for purchases or leasing in the form of the environmental bonus has once again been significantly increased and extended until 2025



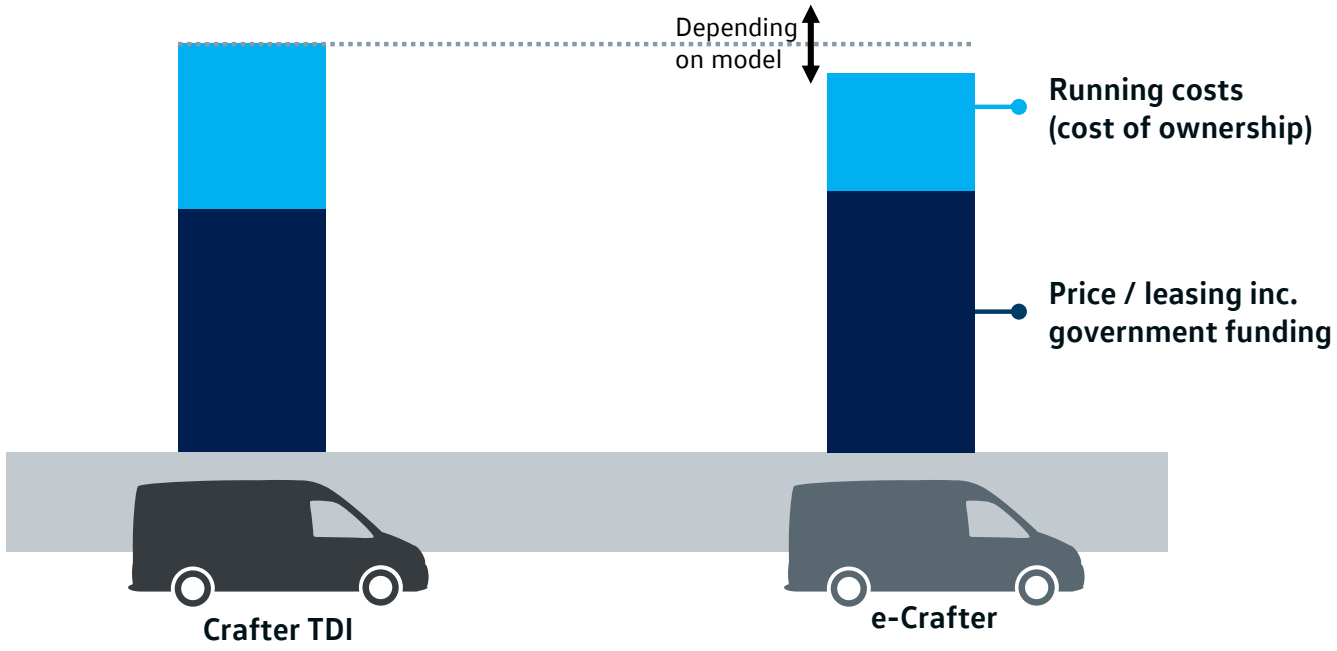
- The environmental bonus for purely battery-powered electric vehicles has been extended until 2021 and has been increased significantly. *
- Furthermore, the 4th Summit of the Concerted Action on Mobility on 17 November resolved to extend the innovation premium – i.e. to double the government share – by the end of 2025. The exact conditions are currently being developed.
- For basic modles with a (gross) list price of up to EUR 47,600, the **higher gross funding rate of EUR 9,570 applies**.
- For basic models with a (gross) list price of up to EUR 75,400, the lower gross funding rate of EUR 5,475 applies
- As the manufacturer, Volkswagen covers a proportion of the bonus of EUR 3,000 plus VAT, totalling EUR 3,570

* A legal entitlement does not exist. The above is solely intended for information purposes and does not purport to be complete. All information is subject to change or correction. Additional information is available from your Volkswagen Dealer or at www.bafa.de.

Commercial Vehicles

Total cost overview using the Crafter as an example*

In terms of total cost of ownership (TCO), electric vehicles may be at the same or even below the level of similar vehicles with combustion engines



BEV advantages:

- Government financial support (environmental bonus)
- Lower consumption costs
- Tax exemption
- Lower maintenance costs

These advantages are able to compensate for the higher price of electric vehicles.

The total costs of ownership (TCO) are at the same level as a similar vehicle with a combustion engine.

Tendency: Decreasing TCOs for BEVs.

*Heavily simplified overview for informational purposes, no legal claim can be derived from this. Subject to change and errors

Commercial Vehicles

Summary | Financial assistance and costs

The economic efficiency of electric vehicles is a key criterion in a customer's decision – the total costs must be at the same level or lower than those for vehicles with combustion engines

- Current financial assistance granted when purchasing a vehicle significantly reduces the total cost of electric vehicles.
- Value loss for electric vehicles is at a similar level to vehicles with combustion engines.
- Electric vehicles fare the best when it comes to operating costs.
- Another advantage for electric vehicles is the development of battery prices. Since 2010, prices for lithium-ion batteries have fallen by around 85%.
- Even in 2020, light electric commercial vehicles in both rural and urban areas have lower TCOs than vehicles with a combustion engine.

VW Commercial Vehicles e-Mobility Guide

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- 2.2 Financial assistance and costs
- **2.3 Safety | Questions and answers**

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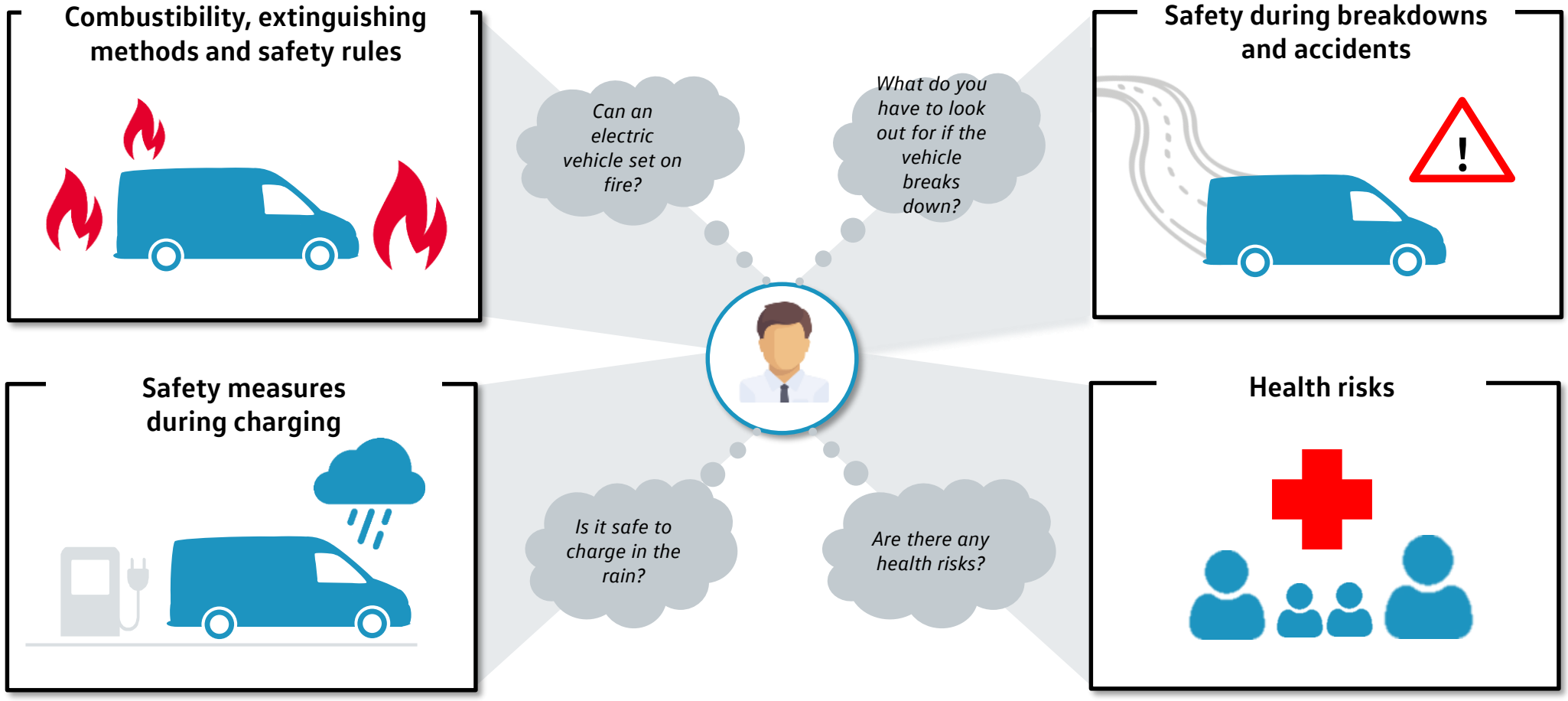
Volkswagen Commercial Vehicles provides answers to relevant safety-related questions



Commercial Vehicles

Combustibility and extinguishing methods

Can an electric vehicle (or the battery) set alight?
Vehicle fires are possible as is also the case with conventional vehicles. A low residual risk of a delayed outbreak of fire additionally exists for electric vehicles. In particular, if damage occurs to the high-voltage battery in which the electrical and chemical energy is stored. The solid and liquid chemicals inside it may burn. However, the lithium metal will not burn.

How long does an electric vehicle burn?
Even despite a fire being extinguished, larger batteries can emit heat for several hours. However, a fire can quickly be extinguished if water is applied to specific areas of the battery.

What is the best extinguishing method?
As the extinguishing process is also dependent on the situation, procedures should be carried out as for a normal vehicle fire. When doing this it is important to observe the information on the rescue cards and make sure the battery is disconnected. Just like the entire electric vehicle, the best method is to apply water directly to the battery as the cooling of the battery and the removal of oxygen extinguishes the battery fire. While CO_2 can stop secondary fires, the battery itself will continue to react without flames.

Can fire-fighters receive electric shocks if they extinguish a vehicle fire using water?
No. A fire may be immediately extinguished using water. At the most, the water jet causes a local short-circuit on the possibly open high-voltage system, but no current flows into the water jet. Volkswagen provides the fire brigade with rescue guides, rescue cars and training videos.

Commercial Vehicles

Safety during breakdowns and accidents

What should I do in the case of an accident or breakdown? And what do I need to do? As for any accident, all occupants should leave the vehicle without delay and proceed to a safe location.

Can I get an electric shock after an accident if I touch the vehicle?
This is highly unlikely but may not be entirely ruled out, in particular in cases of severe accidents. If the system detects an accident in which the airbags have been triggered, the high-voltage battery and electrical system are automatically disconnected from each other. In addition, the vehicles are fitted with several varied safety mechanisms.

What has to be considered when towing an electric vehicle? An electric vehicle may be towed like any conventional vehicle. If being transported after a fire, recommendations state that the vehicle should be accompanied by a fire engine.

Do electric or hybrid vehicles involved in an accident have to be parked or stored in any special manner?
As with conventional vehicles, the following applies for electric or hybrid vehicles involved in an accident as to conventional vehicles: they must be parked outdoors in a closed-off area for fire safety reasons – at a sufficient distance (5 metres) to other cars, buildings, flammable objects and surfaces. The parking of an electric or hybrid vehicle with a damaged battery system in an enclosed building is not recommended under any circumstances.

How long must an electric or hybrid vehicle which has been involved in an accident remain in quarantine?
Electric or hybrid vehicles involved in an accident must be securely parked in accordance with local quarantine regulations until re-igniting is no longer probable. Both the duration and further procedures always vary from case to case and are determined by a high-voltage expert.

Commercial Vehicles

It is still safe to charge the vehicle in rainy or wet weather

Is charging safe in the rain?
The vehicle body cannot be electrically charged. Circuit breakers both in the battery and in the fully isolated charging cable ensure safe charging in the rain.

Will I get an electric shock if the vehicle runs into a flood?
No. There is no increased risk of receiving an electric shock in water thanks to numerous safeguards in the high-voltage system.

Can I get an electric shock if a cable becomes disconnected and I touch the vehicle body?
No. For this to happen you must be in contact with both poles – that is to say, the positive and negative cable. The high-voltage battery system also contains numerous safeguards for the prevention of an electric shock.

Is charging safe in a thunderstorm? What happens in the event of a lightning strike?
As during any thunderstorm, remaining unprotected outdoors and having any contact with electrical equipment should be avoided. Damage to the vehicle's internal electrical circuits and to the charging station may result in cases of lightning strikes to the car or in its surrounding area. Charging stations therefore generally have overvoltage protection. It is best to ask the operator of the charging station about the presence of suitable protective devices.

How safe is the wall box for my home? A power cut can only occur in the worst case if your charging station has not been connected in an expert manner. A monitoring system with multi-stage coupling points for live components ensures the relevant level of safety while using the wall box and while charging.

Commercial Vehicles

Health risks must be ruled out completely

Are people affected by electromagnetic fields?
Volkswagen is significantly below the legal requirements and sets high standards for the components used. Electromagnetic compatibility and electromagnetic environmental compatibility are taken into account in the early development stages and compliance with this is ensured throughout the entire development process. Electric vehicles are designed in such a way that even adverse effects experienced by especially sensitive people, such as those with medical implants, are minimised.

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Commercial Vehicles

General requirements related to charging

Customers would like to see standardised charging stations, cables and connectors, and are calling for more transparency regarding pricing and billing as well as extensive infrastructure coverage

Charging infrastructure

- Comprehensive availability of charging stations for all applications
- Charging stations with quick-charging functions
- Charging stations that are standardised across brands
- Easy access to charging stations
- Functional charging stations with working technology

Cables & connectors

- Standardised cable type and length
- Standardisation of the various connector types
- Standardised equipping of electric vehicles with cables
- Standardised equipping of charging stations with cables
- Simple and intuitive use of cables and connectors

Billing

- Transparent energy pricing
- Standardised billing method for charging processes (e.g. session fee, price/kWh)
- Division into private and commercial billing
- Overview of charging operations completed

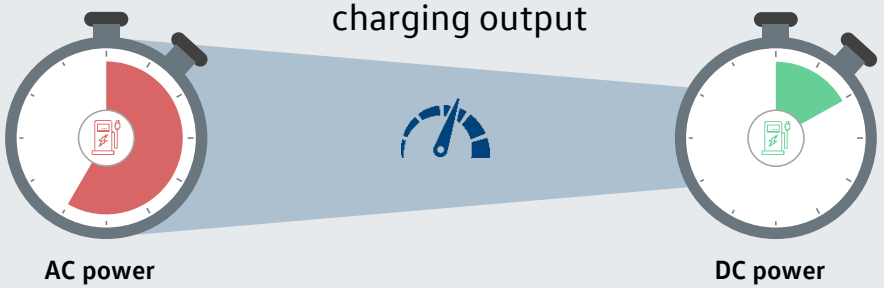
Commercial Vehicles

As well as increasing the charging output, the simultaneous expansion of the charging infrastructure is essential for ramping up the electric mobility market

Time-based

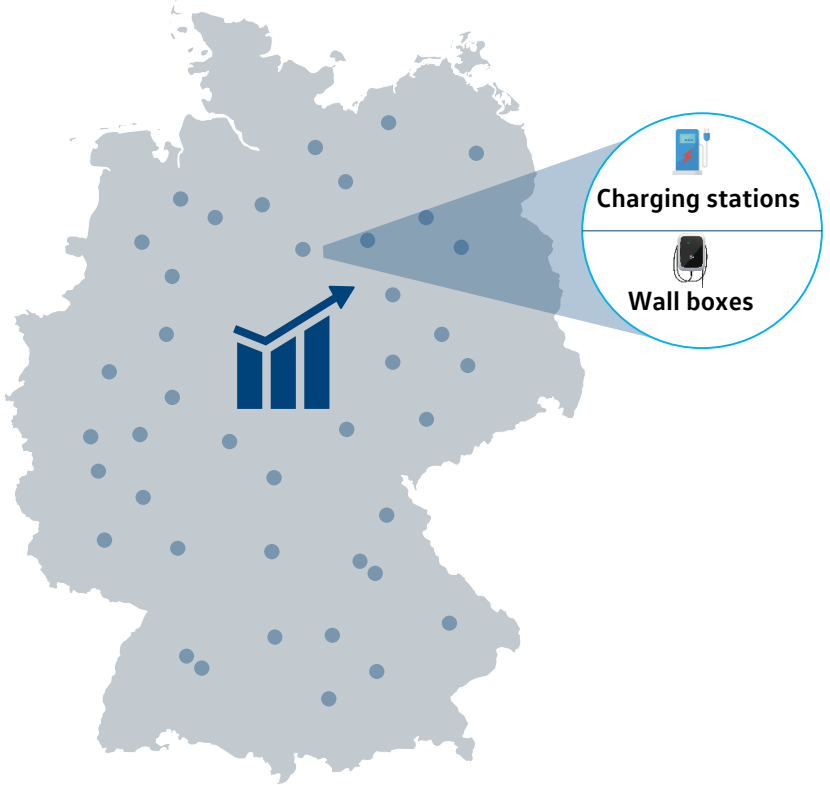
Charging output and times

Shorter charging times caused by increased charging output



Geographical

Expansion of the charging infrastructure



Commercial Vehicles

Volkswagen Commercial Vehicles distinguishes between four different charging scenarios and is involved in the expansion of the respective charging infrastructure

@Home

25 % of all charging processes

@Work

60 % of all charging processes

@Public

10 % of all charging processes

@Highway

5% of all charging processes

SLOW (AC) | **FAST (DC)**

Charging while parked

- AC up to 11 kW
- Charging overnight
- ID. Charger or household socket
- Customers can profit from state financial assistance

- AC up to 11 kW
- DC 22–150kW
- Charging during downtimes (company cars, customers, employees)
- ID. Charger, charging station
- Support programme under development (commercial charging)

Charging during a pit stop

- AC up to 22 kW
- DC up to 350 kW
- Already over 33,000 charging points in Germany – Rising at an exponential rate

- DC up to 350 kW
- Fast charging
- Every 120–150 km
- Already over 3,000 fast-charging stations in Germany – Rising at an exponential rate

Commercial Vehicles

Volkswagen is making the switch to electric mobility easier by providing a comprehensive charging eco-system

@Home

Elli Naturstrom®

- With the ID. Charger, Elli offers various wall boxes for private use
- With **Volkswagen Naturstrom** your electric vehicle is also charged in a carbon-neutral manner
- Direct link to the Elli website **here**

@Work

Elli Nutzfahrzeuge

- Volkswagen Commercial Vehicles and Elli offer their fleet customers advice on electric mobility and charging infrastructure
- Elli provides the required charging hardware and installation services as well as charging infrastructure services

@Public

Charge &Fuel We Charge

- Via We Charge, Volkswagen Commercial Vehicles offers access to over 150,000 charging stations in Europe

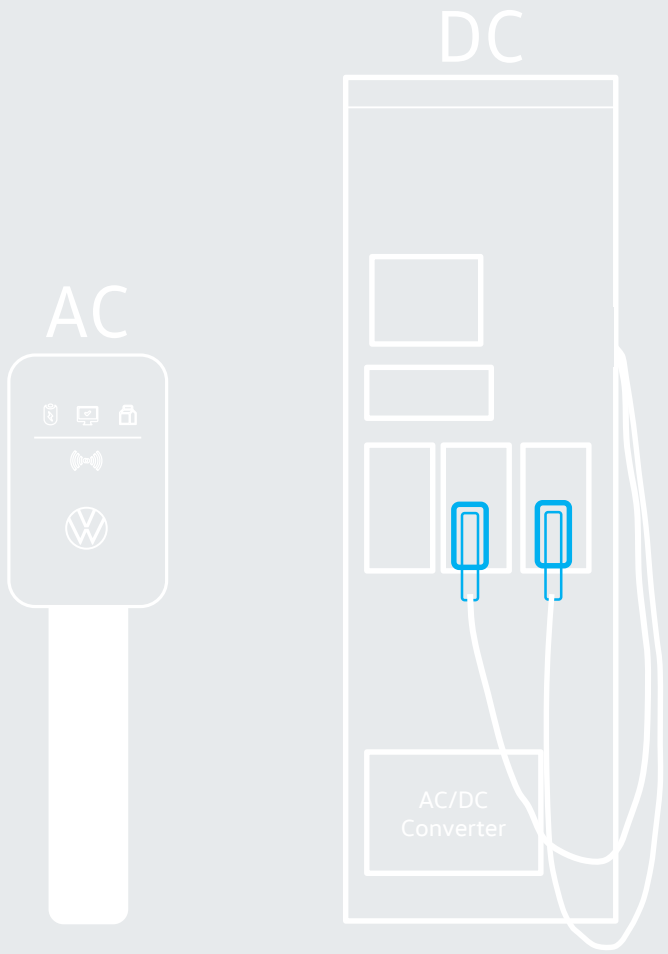
@Highway

IONITY

- The joint venture IONITY has already built over 300 quick-charging stations in Europe. Further stations are being planned.
- Can be used with **We Charge** and **Charge & Fuel**.

Commercial Vehicles

The various charging styles
A distinction is drawn between AC and DC charging

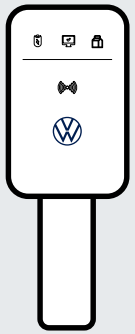
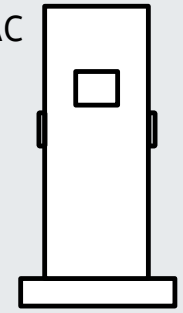


- **AC charging** takes place at home, at work or at the depot with a charging output of up to 22 kW. By connecting the AC connector, the battery in the vehicle is charged after the voltage is commutated to DC.
- **DC charging** can also take place at the depot. However, this mainly takes place while out and about and the charging output currently reaches up to 350 kW. The vehicle does not require its own rectifier.
- **DC charging is generally the faster charging solution.**

Commercial Vehicles

The various charging solutions

There is the ID. Charger and the AC charging station at home and at the depot

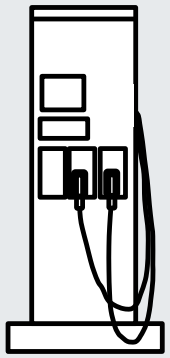
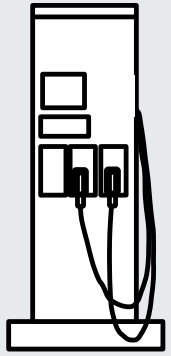
Charging solution	Description
▶ Wall box AC ▶ Cost-effective 	• Charging is up to 5x faster than with a household socket (ID. Charger 11kW) • Mounted on the wall (at home) or a charging column (depot) • Weather-resistant and stable • “Smart” variants with meter • ID. Charger with fixed type-2 connector
▶ Charging station AC ▶ Cost-intensive 	• Charging is quicker than with the ID. Charger (depends on the vehicle) • Charging column design • Weather-resistant and stable • “Smart” variants for billing, monitoring • AC charging stations normally need Mode 3 cables (standard equipment in an electric vehicle*)

* Apart from e-Crafter

Commercial Vehicles

The various charging solutions

Various charging stations can be used to charge while out and about

Charging solution		Description
▶ DC charging station		• DC charging with up to 350 kW • At relevant service stations and on the motorway • Currently the quickest way to charge • DC charging stations have a permanent connector
▶ AC/DC charging station		• Charging with AC/DC (combined) • Weather-resistant and stable • Quick charging method • AC/DC charging stations have a permanent connector

Commercial Vehicles

VW Commercial Vehicles e-Mobility Guide

Commercial Vehicles

01 Challenge and strategy

- 1.1 Sustainability strategy
- 1.2 goTOzero environmental mission statement
- 1.3 Overarching Group strategy

02 VW Commercial Vehicles e-vehicle portfolio

- 2.1 e-vehicle portfolio
- 2.2 Financial assistance and costs
- 2.3 Safety | Questions and answers

03 Charging

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- 3.3 Length of the charging process

04 Charging infrastructure

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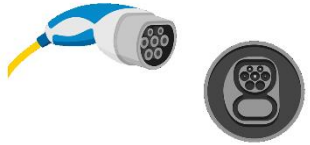
- 4.2 @Work
- 4.3 @Public
- 4.4 @Highway

For charging, a distinction is drawn between quick charging with direct current (DC) and charging with alternating current (AC)

	DC charging infrastructure	AC wall box/charging station	AC Schuko connector
Vehicle charging capacity	**50, 100 or 125 kW***	**7.2–11 kW**	**2.3 kW**
Connector in the vehicle	 CCS connector	 Type 2 / Mennekes connector	 Type 2 / Mennekes connector
Charging cable	 Mode 4 cable (permanently connected to the charging station)	  Mode 3 cable (**standard** scope of supply**)	 Socket  Mode 2 cable (**optionally** available)

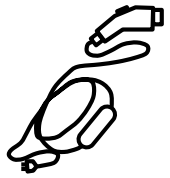
* Using the ID. 3 as an example | ** Apart from e-Crafter

Commercial Vehicles

Overview of charging cables at Volkswagen Commercial Vehicles

Which cable is provided as standard in which electric vehicle?




Cable variants	Type of current	e-Crafter	ABT e-Transporter 6.1	T7 PHEV	ID. Buzz
 **Mode 2 cable**	AC	Standard	Optional	Optional	Optional
 **Mode 3 cable**	AC	Optional	Standard	Standard	Standard

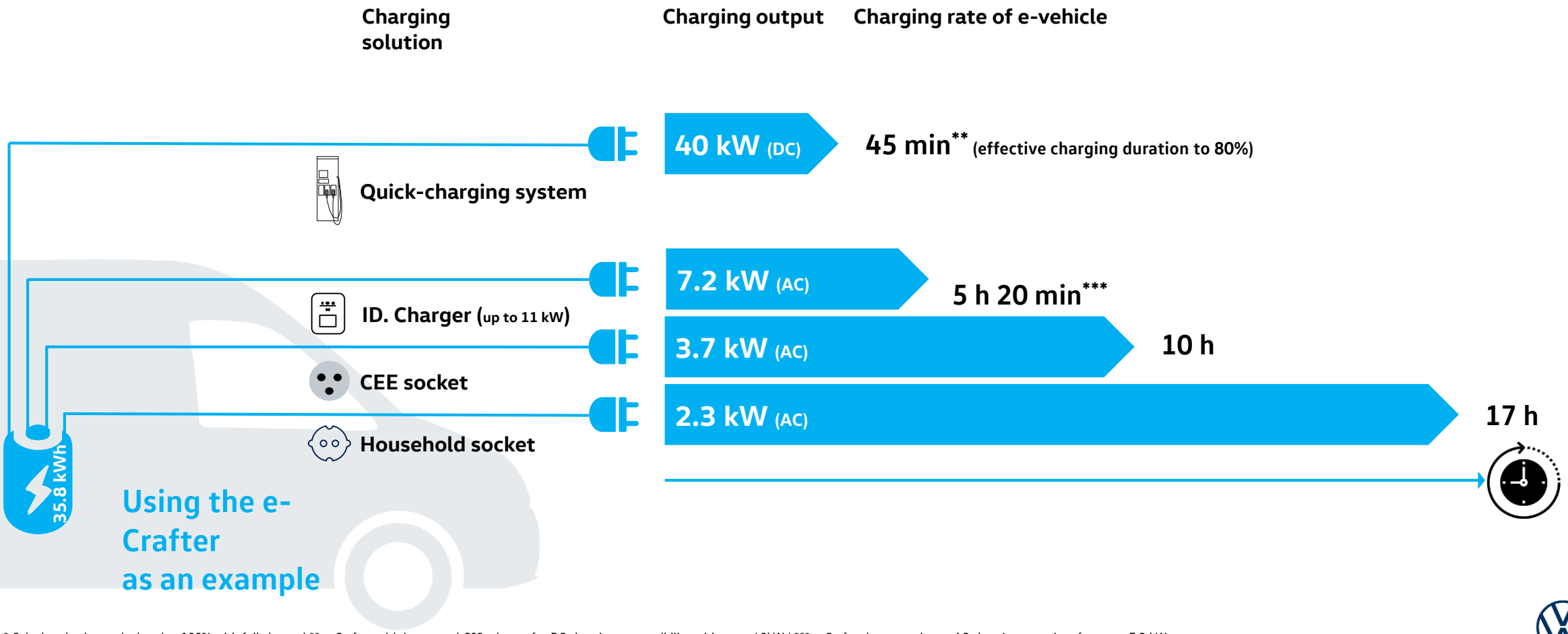
Your Volkswagen Commercial Vehicles ABT e-dealership will provide you with a basic Volkswagen Commercial Vehicles model with a drive train created by our partner ABT e-Line.

Commercial Vehicles

VW Commercial Vehicles e-Mobility Guide

Commercial Vehicles

Example of the length of the charging process for the e-Crafter | The effective length of the charging process is made up of the charging solution's available capacity **and** the electric vehicle's charging speed



* Calculated values calculated at 100% with full charge | ** e-Crafter with integrated CSS adapter for DC charging compatibility with up to 40kW | *** e-Crafter has a maximum AC charging capacity of approx. 7.2 kW

Commercial Vehicles

Summary | Vehicles' charging ability

- **Electric vehicles can be charged with direct current (DC) and alternating current (AC). DC charging is the quicker charging solution.**
- **Charging connector**
  - In Europe, the combined charging system (CCS) is standard.
  - The type 2 connector is standard for electric vehicles and is supported by the ID. Charger and public charging stations.
- **Charging cable**
  - In terms of charging cables, a distinction is drawn between mode 2, mode 3 and mode 4 options.
- **Charging solutions**
  - A distinction is drawn between wall boxes (e.g. ID. Charger) and AC/DC charging stations.
- **The effective charging time is made up of the charging solution's available charging output and the electric vehicle's capacity.**

VW Commercial Vehicles e-Mobility Guide

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- 4.4 @Highway

Charging @Home | Overview

- @Home
- @Work
- @Public
- @Highway

Good to know! This way to funding information (GER)

Key facts

Convenient and safe charging with up to 11 kW, quick compared to household plugs

VW: ID. Charger + installation from a single source: Ordering process, power connection assessment, installation, service, Volkswagen Naturstrom®

Good to know

Standardised state financial support for private charging infrastructure and additional regional support for charging infrastructure in private households, if eligible under the applicable municipal funding guidelines

An ID. Charger is not manufacturer-dependent and can be used for every electric vehicle

* A product and offer from Volkswagen Group Charging GmbH (Elli)

Commercial Vehicles

Example Germany

The new Volkswagen subsidiary Elli offers comprehensive charging solutions for homes – all from a single source

Elli

ID. Charger

Billing

Volkswagen Naturstrom®

Installation

Commercial Vehicles

Example Germany

Volkswagen Naturstrom® | In Germany, Elli offers individual customers 100% green energy at home

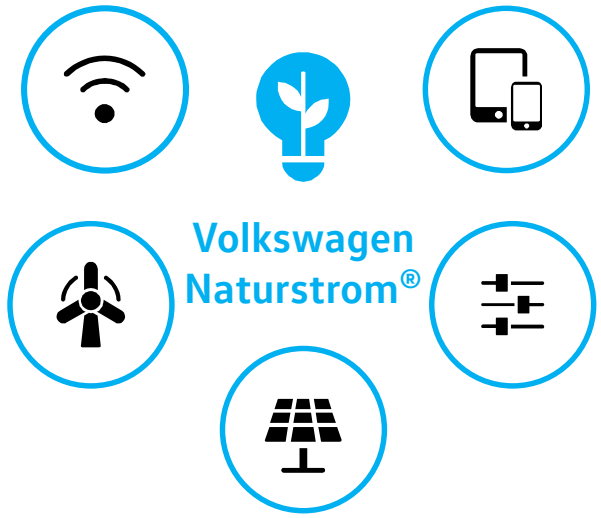
To the Naturstrom offer: **Click here!**

Available across Germany

Volkswagen Naturstrom® is currently only available for private customers in Germany.

Online sales

Volkswagen Naturstrom® is currently sold via a separate online store. It can also be sold via Volkswagen's dealership organisation.



100% green power

Volkswagen Naturstrom® is a green power tariff certified by TÜV Nord. The power is obtained exclusively from regenerative sources in Germany or ecological power plants in Austria and Switzerland.

Full compatibility & future-proof technology

Volkswagen Naturstrom® is due to be closely integrated into offers from the Volkswagen Group – such as We Charge or We Share.

Expansion of renewable energy

The Volkswagen Group is promoting the expansion of renewable energy, including by making its own investments in renewable energy.

Commercial Vehicles

Example Germany

Charging @Home | Overview and functions in the current ID. Charger product portfolio

- **@Home**
- **@Work**
- **@Public**
- **@Highway**

All variants with 4.5 or 7.5 m charging cable

	ID. Charger from €479	ID. Charger Connect from €689	ID. Charger Pro from €999
Charging with up to 11 kW AC	●	●	●
Controlled using an app		●	●
Wi-Fi/LAN (internet capable)		●	●
Plug & Charge ready		●	●
Access control (RFID authentication)		●	●
Intelligent home network/PV array (EEBus)		●	●
Mobile communication (4G/LTE)		◐ optional	●
Integrated power meter*			●
Billing option for company cars			●

More information can be found here: Elli

* Not compliant with calibration regulations, i.e. no sale of electricity possible. However, can be invoiced in a fleet context

Commercial Vehicles

Elli online shop | The Elli online shop offers convenient access to the charging ecosystem and facilitates a direct sales model

Via VWCV online shop
Customer front end

Customers Access

Dealerships Access

Via dealership front end
In the Group Retail Portal (GRP)

The online shop

- **ID. Charger inc. logistics**
- **Online pre-check**
- **Installation (optional)**

✓ ***Seamless integration into the customer journey***

To the online shop **Click here**

Commercial Vehicles

Ordering process from the customer's perspective | Elli organises the installation process for all three variants of ID. Charger wall boxes

1a

VW/VWCV dealerships

1b

Elli online shop

Customer orders an ID. Charger from the dealership or directly via the Elli online shop.
Link: https://charging-energy.elli.eco/de-de/IDcharger

2

Online appraisal

The customer performs an online pre-check of the installation options.

Elli installation package (optional)*

3

On-site appraisal

Local installation process performs an on-site appraisal of the installation options. Depending on the results, the standard installation package is offered with optional additional components:

Standard installation package

- Mounting + installation
- Laying of cables up to 15 m
- Up to 2 wall penetrations
- Fuse installation
- Hardware configuration/ registration etc.)
- Functional tests
- Commissioning
- Customer training

Additional components

- Additional cables
- Additional wall apertures
- Ground work
- New fuse box

4

Installation

After the offer has been made and accepted:

The technology is installed and the customer receives training.

*Can also be installed by independent electricians

Commercial Vehicles

VW Commercial Vehicles e-Mobility Guide

Commercial Vehicles

Charging @Work | Overview

- @Home
- @Work
- @Public
- @Highway

Good to know

Downtimes are used as charging time – no restrictions on usage.

Low charging outputs sufficient for extended parked periods or charging overnight.

The electrification of depots requires an extensive planning phase and can result in high costs. Load management can help here.

Installing a load manager helps to make sure that the available charging output is shared between all electric vehicles to be charged as optimally as possible. This can save on high investment costs for extending network connections and prevent peak loads that would lead to an increase to the annual power price.

Commercial Vehicles

Charging @Work | Volkswagen Commercial Vehicles offers fleet customers holistic e-Consultancy and

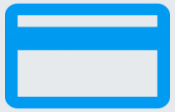
- @Home
- **@Work**
- @Public
- @Highway

Product and range

Suitable charging infrastructure

Management of charging infrastructure
(Charge point operator backend)

Management of peak loads
(Load management)



Charging cards and billing solutions for home

Building work, connection power

Fleet customers require a wide range of advice on (complex) solutions

Commercial Vehicles

VW Commercial Vehicles e-Mobility Guide

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- 2.2 Customer requirements
- 2.3 e-vehicle portfolio
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- **4.3 @Public**
- 4.4 @Highway

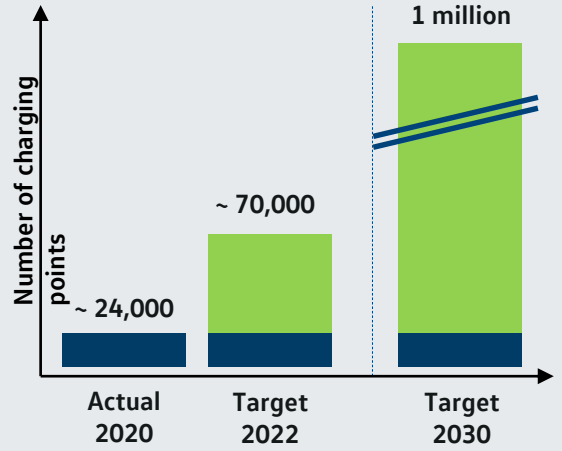
Example Germany

Charging @Public | The German government is increasing its support for expanding public charging infrastructure

- @Home
- @Work
- **@Public**
- @Highway

Click for more information

Establishment of the National Control Centre for Charging Infrastructure to promote the swift expansion of comprehensive, user-friendly charging infrastructure between all stakeholders (German government, states, cities/local authorities, energy providers, supermarkets, refuelling stations, etc.)



Reinforced promotion of charging points at customer car parks (call for this issued in spring 2020)

In addition to the accelerated expansion of public charging infrastructure, EUR 200 million was made available for private charging infrastructure for the first time in 2020

Expansion of charging points at filling stations through a supply requirement

Various cities and local providers with their own funding programmes

Planned erection of 100,000 charging points at vehicle manufacturers and dealerships by 2030

The planned legislative changes to the German Home Ownership Act (WEG) and Civil Code (BGB) will continue to push and promote the expansion of charging infrastructure

Commercial Vehicles

Charging @Public | Charging card offer from Volkswagen for using publicly accessible charging stations

- @Home
- @Work
- **@Public**
- @Highway

Key facts

The use of public charging stations is covered by a charging card offered by Volkswagen for private and commercial users:

We Charge: 

Charge & Fuel: 

Good to know

Parked periods (e.g. while shopping) can be used to charge the vehicle

Allows for public charging (even over night)

According to the coalition agreement, up to 70,000 charging points are due to be built in Germany by 2022

By the end of 2020, the automotive industry had already built 15,000 charging points on its premises and at its dealerships The goal was therefore met two years earlier than planned.

Commercial Vehicles

Charging @Public | Overview of the charging cards offered by Volkswagen

We Charge*

Private, individual and small-business customers

via Volkswagen dealership network

Charge & Fuel**

Fleet customers

via Volkswagen Financial Services AG

* For this, the customer requires a Volkswagen ID, the We Connect ID. app from VW AG and must conclude a charging tariff contract with Elli (Volkswagen Group Charging GmbH)

** Offered by Volkswagen Financial Services AG

Commercial Vehicles

Charging @Public | We Charge
Advantages and functions

- ✓ **Access to over 150,000 public charging points in Europe with one card**
- ✓ **Competitive We Charge tariff inc. IONITY quick-charging network**
- ✓ **Simple authentication at public charging stations via RFID card or app**
- ✓ **Automatic payment with monthly invoices and charging statistics**

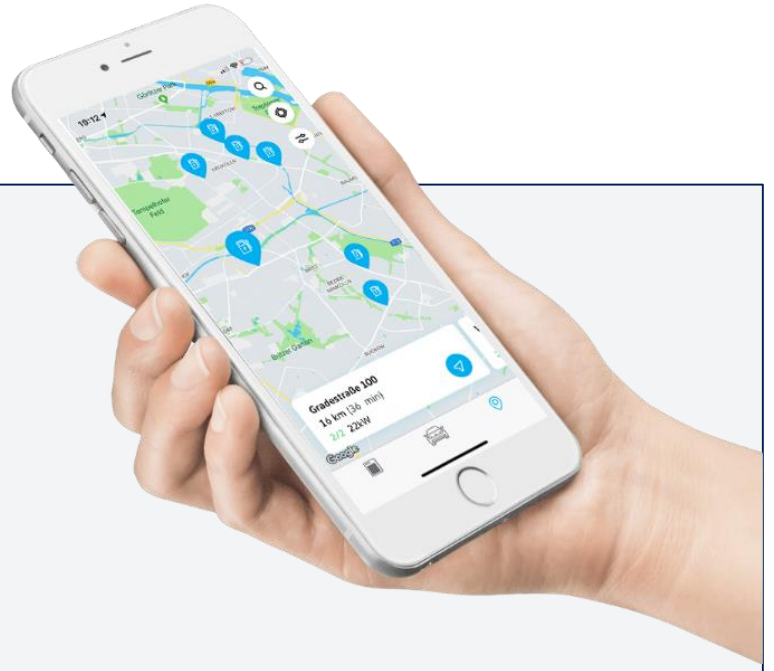
NOTE

The following functions can be used from the launch of the ID. Buzz:

- Fully integrated into the Volkswagen We Connect ID. app
- We Charge charging stations can be located in the vehicle's navigation system

Commercial Vehicles

Charging @Public | We Connect ID. app
Advantages and functions



- ✓ **Easy way to look for and locate public charging points**
- ✓ **Display of the availability, properties and costs of public charging points**
- ✓ **Navigation to public charging points**
- ✓ **Start/stop for charging processes from 2021**
- ✓ **Push notifications, managing RFID cards, configure and manage connected VW ID. Chargers (Connect / Pro)**

NOTE

The following functions can be used as of the launch of the ID. Buzz

- EV-optimised route planning with intelligent charging stop assistant
- Check the vehicle's charge level (SoC) at any time

Commercial Vehicles

The We eco-system allows users to access public charging infrastructure in four steps

@Home

@Work

@Public

@Highway

The We Connect ID. app

The We Connect ID. app is available in most conventional app stores.

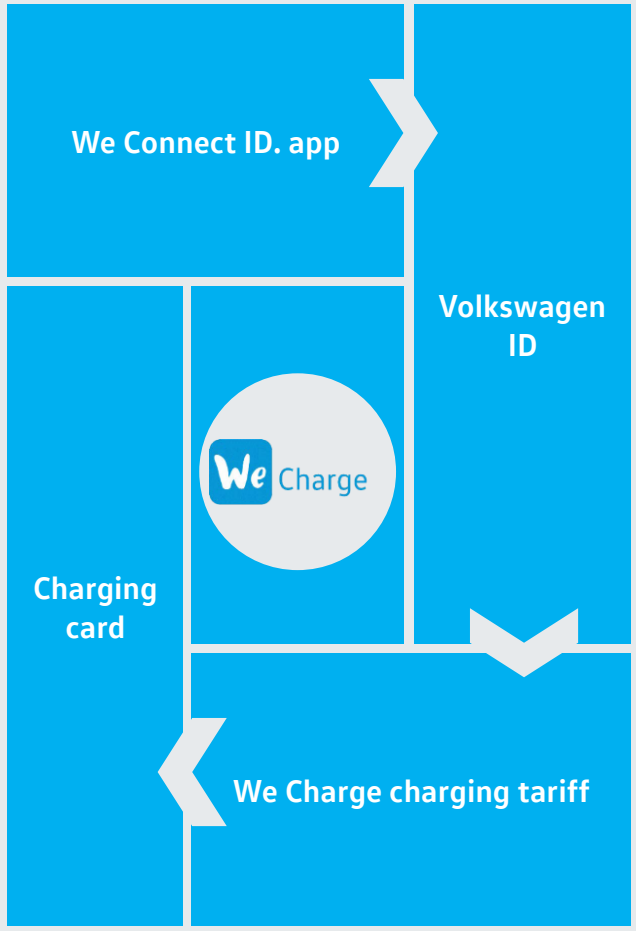
We Charge is fully integrated into the app as a service.

Charging card

You can use the charging card to verify your identity at the charging station.

The data stored in the card is used to bill for the charging process.

The charging card must be activated in the app before it is used for the first time.



The Volkswagen ID

The Volkswagen ID allow you to access our We eco-system.

To be able to use We Charge, you must use your Volkswagen ID to log into the We Connect Id. app.

The charging tariffs

Activate the We Charge Free tariff

Commercial Vehicles

Range of products and services | Charging and payment across Europe using just one charge card and app at around 150,000 charging stations.

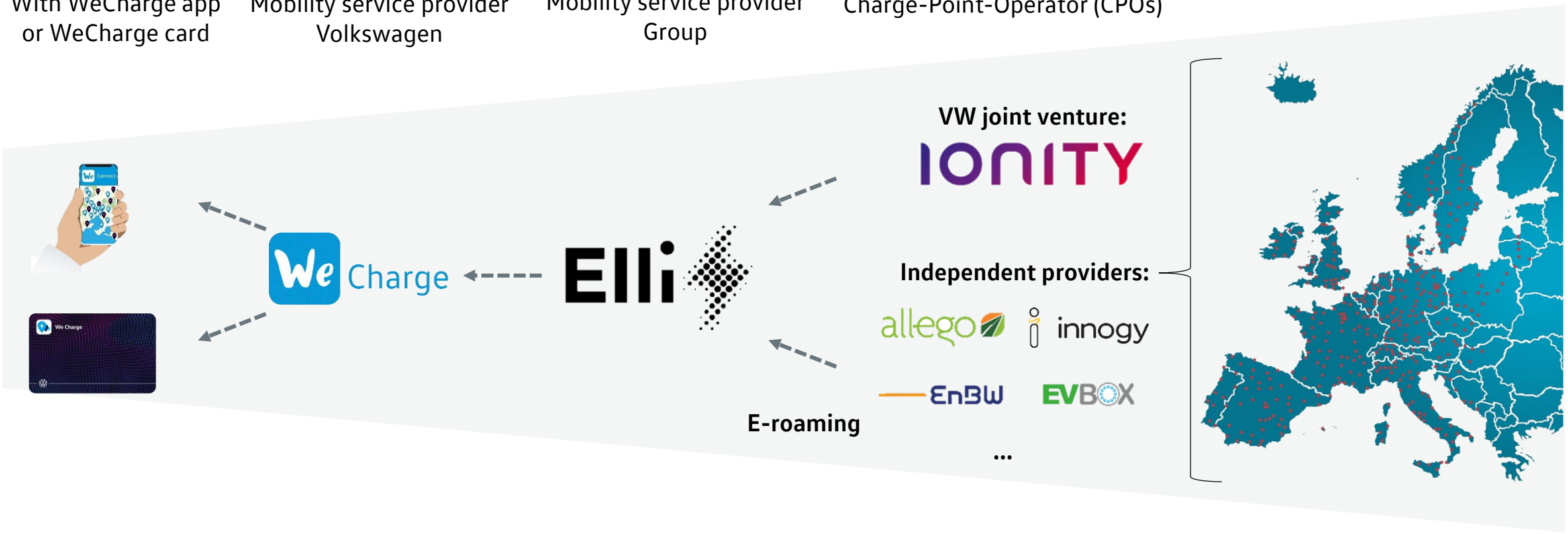
Customer
With WeCharge app or WeCharge card

We Charge
Mobility service provider Volkswagen

Elli
Mobility service provider Group

Operators
Charge-Point-Operator (CPOs)

> 150,000 charging points



* Charge Point Operator (CPO)

Commercial Vehicles

Charging @Public | Charge & Fuel
Advantages and functions

- ✓ **Access to over 145,000 public charging points in Europe with one card**
- ✓ **Competitive tariff inc. IONITY quick-charging network**
- ✓ **Electronic billing of all monthly charging and refuelling transactions**
- ✓ **Option to integrate FleetCARS**
- ✓ **Offer for electric and plug-in hybrid vehicles from Volkswagen Commercial Vehicles also available for mixed fleets**
- ✓ **Cash-free refuelling and other vehicle-related services (e.g. car washes) at all places that accept LogPay in Germany/Europe (Aral, Total, Agip, HEM, JET, Star, Esso, AVIA and many more)**

Commercial Vehicles

Charging @Public | Charge & Fuel app
Advantages and functions

- ✓ **Easy way to look for and locate public charging points**
- ✓ **Display of the availability, properties and costs of public charging points**
- ✓ **Navigation to public charging points**
- ✓ **Start/stop for charging processes**
- ✓ **Convenient search and filter function in the Charge&Fuel app provides a quick overview of the locations of all connected refuelling and charging stations and current charging point occupancy**

Commercial Vehicles

VW Commercial Vehicles e-Mobility Guide

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- **4.4 @Highway**

Example Germany

Charging @Highway | There are currently a range of different projects under way to expand charging infrastructure along motorways in Germany

- @Home
- @Work
- @Public
- @Highway

Betreiber	#Standorte	Ziel	Region	Charger Typ
IONITY	400	2020	Europa	350 kW
TOTAL	300	2022	Mitteleuropa	175 kW (350kW-ready)
Shell	50+	2019+	Süddeutschland	150 kW (350kW-ready)
bp	400+	2021	UK, DE	150 kW
EnBW	1000	2021	Deutschland	150 kW (teilw. 350kW-ready)
FASTNED	100	2019+	Mitteleuropa	150 kW / 350KW (30%)
allego	322	offen	NL, BE, AT	350kW
fortum	~50	offen	Nordics	350kW

Other energy providers / filling stations are already involved in expanding infrastructure on motorways

Click ↑ for more information

The master plan drawn up by the National Control Centre for Charging Infrastructure provides for the construction of at least four charging points with an output of at least 150 kW at operational service stations on motorways by 2022

Commercial Vehicles

Charging @Highway | IONITY offers access to the quick-charging network in Europe

- @Home
- @Work
- @Public
- @Highway

Key facts

- **Over 300 stations**
  in Europe, every 120 km on central motorway axes
- **4–12** charging points per station
- Charging with up to 350 kW
  (depending on the electric vehicle's charging capacity)

IONITY

Good to know

- Parked periods (e.g. breaks on long distances) can be used to charge the vehicle
- Allows for public charging (even over night)
- Roughly 2,400 charging points in total, IONITY charging stations approx. every 120 to 150 km
- A quick-charging network is being built along Europe's motorways and fast routes

Commercial Vehicles

Summary | Charging infrastructure offers

- **In 2021, the number of public charging points in Germany will continue to rise at a rapid rate**
- **Volkswagen Commercial Vehicles distinguishes between four charging scenarios with a tailored portfolio of charging solutions**
  - @Home | @Work | @Public | @Highway
- **@Home: The Group subsidiary Elli offers wall boxes (ID. Chargers) for quick and safe charging and also supplies Volkswagen Naturstrom** (currently only available to private customers in Germany).
- **@Work: Volkswagen Commercial Vehicles offers its fleet customers holistic e-Consultancy.**
- **@Public/Highway: For use of public charging stations, Volkswagen offers a charging solution for its private and commercial users:**
  - Private customers (B2C): We Charge
  - Commercial customers (B2B): Charge & Fuel

List of abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
AC	= Alternating current, charging with alternating current	CO_2e	CO_2 equivalent; an index defined by the United Nations that allows the global warming effect of various greenhouse gases to be compared
BB	Body builder	CO_2 free	A substance is only CO_2 free if no CO_2 is created during both production and use. However, other emissions may still be generated.
ABT	ABT Sportsline GmbH; converts diesel vehicles into electric vehicles, is involved in motor racing and tunes vehicles for the manufacturers Audi, Seat, Škoda and Volkswagen	Carbon-neutral balance sheet	A substance is considered carbon neutral if the CO_2 emissions created during use (production, product, use) are permanently stored and can then be fully offset.
BEV	Battery Electric Vehicle	CPO	Charge Point Operator
Biogas	Biogas refers to gases produced from the fermentation of biomass. “Bio” (biotic) in this context does not mean that this gas is organic in origin.	DC	Direct current
B2B	Business to Business	DCI	Decarbonisation index
B2C	Business to Customer	EREV	Extended Range Electric Vehicle; a battery-power electric vehicle with a combustion engine to charge the battery
CHAdeMO	Japanese standard connector for charging using direct current	EMS	Energy Management System; system that manages communication between, for example, the ID. Charger and energy provider
CCS	Combined Charging System; for quick charging using AC and DC	FCEV	Fuel Cell Electric Vehicle; fully electric vehicle that gets its electrical energy from fuel cells
CEE	Commission on the Rules for the Approval of the Electrical Equipment: AC connector	HV	High voltage

Commercial Vehicles

List of abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
HW	Hardware	PtG	Power-to-Gas; a process in which combustible gases like hydrogen are obtained from water
ICCB	In Cable Control Box; control device integrated into the cable and responsible for communicating with the car in mode 2 charging	PtL	Power-to-Liquid; the same as PtG but the end product is liquid.
ICE	Internal combustion engine	PtX	Power-to-X; conversion of electricity into an alternative drive condition for storage. General term. End products vary. e.g. x= Heat, Chem etc.
ISP	Infrastructure Service Provider	RFID	Radio Frequency Identification; common technology used for identifying users at charging stations
MID	Measuring Instruments Directive; European directive for devices like electricity meters. Relevant for the billing of electrical energy	SchuKo	Short for “Schutzkontakt”; conventional connector for household sockets in Germany. Supports mode 1 charging
MSP	Mobility Service Provider	TCO	Total Cost of Ownership; total costs accrued during the entire period of use
NEDC	New European Driving Cycle; old standard cycle for determining fuel consumption	USP	Unique Selling Proposition
NSC	National Sales Companies	Vmax	Maximum speed
PHEV	Plug-in Hybrid Electric Vehicle; a hybrid vehicle whose battery can also be charged externally	WLTP	Worldwide Harmonized Light Vehicles Test Procedure; standard European driving cycle valid since 2017 used to determine a vehicle’s emissions and consumption

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