



Quick, easy and convenient – Charging solutions at Volkswagen

Wolfsburg, November 2020

Note: You will find this media information as well as further information, images and films on e-mobility on the Internet at www.volkswagen-newsroom.com.

All the equipment information only applies to the German market.

**ID.3: Electric consumption (NEDC) in kWh/100 km: 15.4-14.5 (combined);
CO₂ emissions in g/km: 0; efficiency class: A+**

**ID.4: Electric consumption (NEDC) in kWh/100 km: 16.9-16.2 (combined);
CO₂ emission in g/km: 0; efficiency class: A+**



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At a glance

Quick, easy and convenient – Charging solutions at Volkswagen

- **Success factor:** Quick, easy, convenient charging is a key factor for the breakthrough of e-mobility.
- **Charging ecosystem:** Volkswagen offers a competitive package for convenient, sustainable charging – from the wallbox to the We Charge charging service and green power.
- **Any time, any place:** Volkswagen customers can recharge their batteries at practically any time and place – at home, on the road and on long journeys. Via We Charge, we offer access to one of Europe's largest charging networks.
- **Rapid charging network:** Via IONITY, Volkswagen operates a pan-European rapid charging network. Rapid charging parks will be available every 120 kilometers in the future.
- **Green power:** With Volkswagen Naturstrom, electric vehicle drivers can also use green power for charging at home, making for especially sustainable travelling. The origin from 100% renewable sources is certified by TÜV Nord.
- **Charging infrastructure:** Public charging is becoming increasingly important. The development of public charging infrastructure needs to be massively boosted throughout Europe.
- **Sprint program:** In Germany, more than 300,000 public charging points will be needed up to 2025.
- **Volkswagen charging points:** Volkswagen itself is installing thousands of charging stations. Throughout Europe, the Group and its dealers will be installing a total of 35,000 charging points by 2025. 11,000 of these charging points will be installed by the Volkswagen brand.
- **Bidirectional charging:** E-mobility can become a key element in the energy transition. Potentially, the growing number of electric cars will create a giant mobile energy storage facility.
- **Elli:** With Elli, Volkswagen has launched its own start-up for all activities connected with the charging of electric vehicles. The company is working on the future of charging.

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A. Charging as a success factor

A key factor for the success of e-mobility. Surveys have repeatedly confirmed that quick, easy, convenient charging will be a key factor for the success of e-mobility. In addition to price and range, concerns related to a lack of charging opportunities are one of the main barriers to the purchase of an electric car. It must become just as easy to charge an electric car as it is now to charge a smart phone. This calls for seamless interaction between the vehicle, charging services and infrastructure. Volkswagen therefore has a holistic commitment to the expansion of charging infrastructure and is investing in a comprehensive charging and energy ecosystem connected with the ID. family.

Four charging scenarios. There are differences between charging and re-fuelling. Instead of driving to a filling station, electric cars are normally charged where they are parked, for example at home or at work. Experts distinguish four charging scenarios:

- @Home: charging at home
- @Work: charging at work
- @Public: charging in public spaces
- @Highway: charging along highways

it is estimated that 70% of all charging operations are currently carried out at home or at work. A further 25% of charging operations are completed at public charging points (by drivers parking on the streets). However, this share will grow as e-mobility becomes more established. The decisive factor will be seamless transitions between the four scenarios, allowing customers to charge their electric car at any time. This is the only way the trust necessary to help e-mobility to a rapid breakthrough in Germany can be established.

A joint task. However, automakers cannot and should not be called upon to establish well-functioning charging infrastructure alone. Volkswagen is committed to open networks and is actively involved in the development of public charging infrastructure. The automotive industry, energy companies and local authorities are all called upon to make the charging of an electric car as simple and convenient as possible.

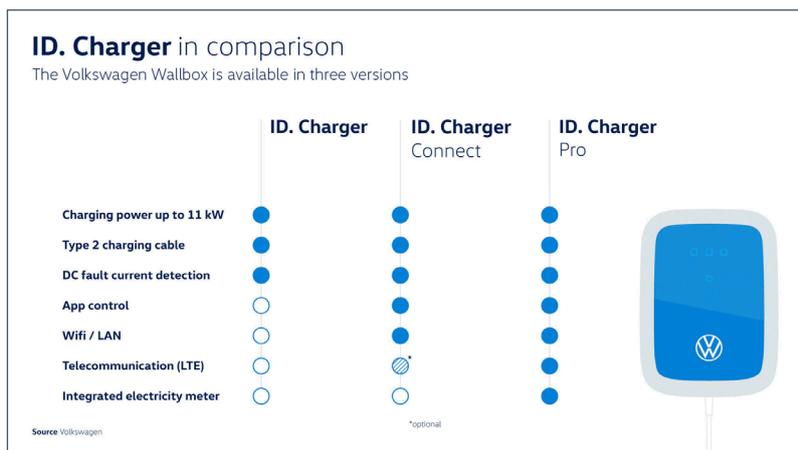


B. Volkswagen's charging ecosystem

From a single source. Volkswagen wants to make the changeover to the electric car as easy and attractive as possible. In addition to the models of the ID. family, Volkswagen is therefore offering a complete package for convenient, sustainable charging. The portfolio ranges from wallboxes for home charging including installation services via green power tariffs to a charging service for charging at public stations – all from a single source without any additional effort. Customers can already book the package they require when purchasing an electric car. The Volkswagen charging ecosystem has the right solution for all charging scenarios including charging at home, on the road and on long journeys.

1. ID. Charger wallbox

Charging at home. Customers with their own parking space in their driveway or garage will normally opt for a private wallbox. This is an especially convenient and economical way of charging an electric car. For these customers, Volkswagen offers its own wallbox, the new ID. Charger. This unit is generally intended for use with the ID.3 and the ID. family but can also be used for all other electric cars with a type II connector. The ID. Charger is currently available throughout Europe in Germany, Italy, Spain, the United Kingdom, Poland, Sweden, Switzerland, Ireland and Finland.



Wallbox for everyone. The ID. Charger is available in three versions. At an introductory price from €388 (Germany) or €399 (Europe), the basic version offers outstanding value for money. The two top models ID. Charger Connect und ID. Charger Pro are also fully networked and allow convenient control from a smart phone. This means that customers keep an overview of all charging operations and benefit from convenient functions such as remote maintenance, access control and regular software updates. The ID. Charger



Media information

Pro also has an integrated power meter, allowing company car drivers to claim electric power expenses. All three versions offer charging capacities up to 11 kW, a fixed type II charging cable and an integrated DC residual current device for maximum protection.

Installation service. Customers purchasing an ID. Charger can also book an optional installation service. Together with certified electricians, Volkswagen offers a comprehensive installation service including effective advice, installation and the commissioning of the wallbox. Potential customers can also carry out a free-of-charge online pre-check. This all-in package makes the process of purchasing a wallbox, which has often been troublesome and complex, significantly more convenient.

2. We Charge charging service

Charging on the road. For charging at public charging points, Volkswagen is offering the new We Charge service. The charging card offers access to one of Europe's largest charging networks with more than 150,000 public charging points. Access using the We Charge card is easy and customers can use their smart phone to search for connected charging stations and to control the charging operation itself. This makes charging on the road extremely convenient and reliable. For customers with an ID.3 or an ID.4, We Charge also offers exclusive price advantages for the use of the IONITY rapid charging network

We Charge packages		
Europe		
We Charge Free All models	We Charge Go ID. Family* 12 month term	We Charge Plus ID. Family* 12 month term
IONITY 0,79 € / kWh	IONITY 0,55 € / kWh	IONITY 0,30 € / kWh
More charging point depending on operator +0,29 € per session	More charging point depending on operator +0,29 € per session	More charging point depending on operator +0,29 € per session
Package 0,- € / month	Package 0,- € / month	Package 9,99 € / month

* Only for Volkswagen ID. models with 100 or 125 kW fast charging capability. For other Volkswagen E-models the following monthly basic fees apply: We Charge Go 7.49 €; We Charge Plus 17.49 €. The prices quoted are valid in Europe excl. Germany until December 31, 2020 including VAT.

IONITY benefits. The charging tariffs are tailored to meet the needs of different user groups. Customers purchasing an ID.3 automatically benefit from the "We Charge Go" tariff at no additional cost. This also includes a reduced price of currently 53 euro-cents per kilowatt-hour (in Germany) for using the IONITY rapid charging network. "We Charge Plus" is the tariff for frequent drivers. Customers with this tariff currently pay only 29 euro-cents per kilowatt-hour for charging on the IONITY network in Germany. They can use the rapid charging network throughout Europe at an especially attractive



price. The package costs €9.73 (Germany) or €9.99 (Europe) per month, which already pays in the case of only one average charging operation per month. The basic tariff "We Charge Free" is also available to drivers of other brands. This covers the complete charging network with more than 150,000 charging points and ensures a basic service for charging on the road.

Digital control. We Charge offers a wide range of digital functions connected with charging, which can all be used via the We Connect ID. app. For example, these functions makes it easy for users to find all the We Charge charging points that are available. The app also provides important information on charging prices and the availability status (vacant or occupied) of charging points. In future, it will also be possible to search only for charging points operated using green power. The intelligent route planning function takes into account both the charging points available and the charging strategy preferred by the user, making it easier to plan long trips.

3. IONITY rapid charging network

High-power charging. In order to make e-mobility fit for widespread use on long journeys, Volkswagen is operating a pan-European network of fast charging stations together with industrial partners under the umbrella of IONITY. 400 HPC (high-power charging) stations will be available along highways throughout Europe – every 120 kilometers, with charging points for more than 2,400 vehicles. IONITY offers charging capacities of up to 350 kW und and will be operated with green power throughout Europe. The charging network is also available to all users, including drivers of brands which do not form part of the joint venture. In addition to the IONITY stations, other suppliers have planned more than 2,200 new HPC facilities.

A meaningful addition for urban areas. To date, high-power charging stations have mainly been installed along highways and other major long-distance roads. In future, high-power charging could also be a meaningful addition to the normal charging infrastructure available in urban areas. This would give electric car drivers considerably more charging options and would also relieve the load on the distribution network. Rapid charging stations use the medium-voltage network, reducing the load on the busier low-voltage network. Volkswagen has already launched a pilot project in this area. A total of 28 rapid charging stations have now been installed in Wolfsburg, away from the highway network.



C. Expansion of charging infrastructure

1. Public charging infrastructure

More public charging. Nationwide public charging infrastructure will play a key role in the success of e-mobility. Volkswagen currently estimates that more than half of all charging operations are completed at home. As the market penetration of e-mobility grows, charging operations will be transferred more and more to public spaces. Three out of four inhabitants of Germany live in conurbations and the possibilities of private charging are restricted in urban areas. Only slightly more than half of the population is employed and therefore potentially has the possibility of charging batteries at the workplace. This is why charging facilities in public spaces must be considerably expanded

Charging infrastructure master plan. According to BDEW, there are about 28,000 public charging points in Germany in mid-2020, around 60 percent more than a year before. The actual number is higher as not all public charging points are included in the official statistics. Nevertheless, the expansion of charging infrastructure needs to be significantly boosted. The German government has made charging infrastructure a key element in its climate protection program and has adopted a charging infrastructure master plan. By 2030, the target is to have a million publicly accessible charging points. The German government has planned investments of more than €3 billion in charging infrastructure.

Sprint program. A sprint program will now be crucial. Over the next five years, about 300,000 public charging points must be provided in Germany. Charging points need to be in prominent positions along the road and available for use in order to build confidence in the new technology. Rapid charging stations may also be a meaningful addition to charging infrastructure in urban areas. They would use the medium-voltage network and relieve the burden on the low-voltage network to which much of the present charging infrastructure is connected (see "IONITY rapid charging network").

Right to a wallbox. Politicians must lay the foundations for creating more private charging possibilities. This also includes the right to install a wallbox; this means that apartment owners and tenants are entitled to obtain permission for the installation of a charging system for electric cars at their parking space. In Germany, legislation to this effect was recently ratified. Comparable legislation will also be needed in other European countries.

2. Engagement of Volkswagen

About 35,000 charging points. Volkswagen is forging ahead with the development of infrastructure and installing thousands of charging points itself. Throughout Europe, the Group and its dealers are developing a total of 35,000 charging points by 2025, including



11,000 charging points of the Volkswagen brand in Europe. These will be located at Volkswagen facilities and at about 3,000 Volkswagen dealerships in all major towns and cities. The Volkswagen Group is investing a total of €250 million in charging points at its locations. Charging at work will become increasingly important because it is a good alternative for people who cannot charge their cars at home. In future, about 20 percent of all charging operations will be completed at the workplace.

Charging solutions for companies. The development of charging parks may also be lucrative for companies as they often have good conditions in terms of the space available and can relatively easily create an additional benefit for their employees. Against this backdrop, Volkswagen is not only involved in activities at its own locations but also offers other companies complete charging solutions for employee parking lots and company fleets via its subsidiary Elli (Electric Life).

Cooperation with retail outlets. Volkswagen is already cooperating with several retail chains on the expansion of charging infrastructure. This way, customers can charge their cars conveniently while they shop. In Germany, Volkswagen has concluded a strategic partnership with the Schwarz Group, which includes the Lidl und Kaufland chains, among other outlets. At the 60 Lidl and 10 Kaufland stores in Berlin, the retail group has installed a total of 140 public charging points for electric vehicles. The additional charging points of Lidl and Kaufland represent a boost of almost 20 percent in the public charging infrastructure in Berlin. In the UK, Volkswagen is cooperating with the Tesco retail chain.

3. Innovative charging concepts

The flexible fast charging station. Volkswagen Group Components, an independent corporate unit, is developing innovations for the establishment and expansion of charging infrastructure. These include the flexible fast charging station, which can be installed almost anywhere where it is required or no charging infrastructure is available. Thanks to fast charging technology, two electric cars can be charged at the same time at up to 150 kW. If connected to the low-voltage grid, the flexible charging station becomes a fixed charging point without calling for the same investment as a comparable fixed charging station. The battery pack installed provides an energy buffer which means that the station can be disconnected from the power grid to relieve the burden on the power grid especially during peak times. To ensure the sustainable utilization of valuable resources, the station is also designed to allow the use of old battery modules from electric cars for energy storage in the future.

Use in practice. Within the framework of a pilot project, 12 charging stations have already been in operation in Wolfsburg since the beginning of 2020. E.ON will be the first cooperation partner to integrate the flexible fast charging stations into its charging network. For the rapidly growing e-mobility market in China, Volkswagen has established the joint venture International Charging Solutions (ICS) for the joint production of the charging station together with the start-up Shanghai DU-POWER New



Energy Technical Co. Ltd. Local production in China and production at the Hanover plant are due to start within the next few months.



The mobile charging robot. The visionary study for underground and other parking garages offers significant cost advantages compared with the full electrification of parking spaces. In this approach, the charging infrastructure is brought to the vehicle and not vice versa. The charging robot consists of a compact self-driving robot and several mobile energy storage units each with an energy capacity of about 25 kWh. The robot is equipped with cameras, laser scanners and ultrasound sensors and can therefore move completely autonomously. Communication with the vehicle takes place via Car to X or using an app. The robot arm connects one of the energy storage units automatically to the electric vehicle. DC charging of the vehicle can then be completed at up to 50 kW. While the mobile energy storage unit remains with the vehicle for the duration of charging, the robot can leave the vehicle to manage the charging of other electric vehicles. When charging has been completed, the energy storage unit is once again disconnected and collected by the robot. This means that operators of parking lots, parking structures and underground parking garages can electrify any parking space quickly and easily.



D. Volkswagen Naturstrom

Energy transition. The system changeover to e-mobility can only make sense if renewable energy is also expanded at the same time. Volkswagen supports a consistent energy transition and the use of green power for charging electric cars. Volkswagen has established its own eco-power supplier, its subsidiary Elli. Since the beginning of 2019, the company has been helping its customers in Germany to realize their own personal energy transition.

Volkswagen Naturstrom®. Elli supplies Volkswagen Naturstrom®, which comes 100 percent from renewable sources. For each kilowatt-hour used by the customer, one kilowatt-hour of electric power from regenerative sources such as wind power, solar power or hydropower is fed to the grid. The power currently comes mainly from hydropower facilities in Germany, Austria and Switzerland. The carbon neutrality of Volkswagen Naturstrom® is verified and officially certified each year by TÜV Nord.

Wind and solar farms. Volkswagen and Elli are supporting the expansion of renewable energies and investing in the construction of their own carbon-neutral wind and solar farms at Volkswagen locations. One of the largest solar farms in northern Germany is already installed on the roof of the Wolfsburg plant. The Salzgitter wind farm currently under construction will have an output of 12 MW and an annual power generation figure of 35 gigawatt-hours. This would be sufficient to supply electric power to about 10,000 households with an average annual consumption of 3,500 kWh.

Eco-power in three clicks. Your personal energy transition could hardly be easier. On the Elli website, it only takes three clicks to select the appropriate eco-power tariff. Customers will need to enter their average annual power consumption, to answer the question of whether they have a battery electric vehicle and if so how many kilometers they drive per year. Thirdly they must enter their postcode. The system then automatically calculates the appropriate tariff.



E. Elli

Start-up for energy mobility. Elli is Volkswagen's own start-up for all activities connected with the charging of electric cars. "Elli" stands for "Electric life" and is a powerhouse for the Group's energy and charging solutions. For example, Elli develops and produces the wallbox offered by the Volkswagen brand as the ID. Charger. In future, Elli will also supply wallboxes for the SEAT and SKODA brands. The strategic goal of Elli is to digitally link the areas of energy and mobility and to provide optimum support for the changeover to e-mobility. The company was established in 2018 and now operates from locations in Munich, Berlin and Wolfsburg.

From wallbox to fleet management. Elli offers intelligent comprehensive, data-driven charging solutions ranging from hardware to services and maintenance – both for consumers and for companies. The product portfolio includes the business areas of wallbox & installation, B2B services (fleet management), public charging including invoicing/payment and green energy. Elli sees itself as part of smart mobility and is active at the interface between energy and mobility – for example with smart power tariffs or IT-based energy management systems. As part of the Volkswagen Group, Elli will be the first supplier in the market to offer drivers and fleet managers of electric vehicles a seamless, holistic charging and energy experience.





F. Outlook: the future of charging

A key element in the energy transition. The breakthrough of e-mobility will create a giant mobile energy storage facility: for example, several hundred thousand ID.3 cars can store as much energy as all the pumped-storage power plants in Germany. Especially in the context of the energy transition, this mobile storage facility offers considerable potential and will need to be used intelligently. Nowadays, wind turbines and solar farms are often shut down when power generation exceeds current demand. In future, these facilities can continue to operate as it will be possible to store the excess green power using electric cars. This way, the electric car could not only make a contribution to network stability but also become a key element in the energy transition.

Bidirectional charging. Over the next few years, Volkswagen will introduce bidirectional charging on its vehicles and charging solutions step by step. Currently, work is in progress on a new edition of ISO 15118. In future, this will be the standard for bidirectional charging using CCS connectors in Europe, a key prerequisite for the establishment of this technology. This way, the companies and sectors participating could finally bring bidirectional charging to mass production. As a first step, the electric car will initially be integrated into the home network, with smart connection (the "vehicle-to-home" stage).

Vehicle-to-home. The integration and intelligent networking of the electric car in the home network will offer considerable benefits. For example, it will be possible to charge the electric car in a targeted way when electric power is offered at especially low cost and excess power is available. On the other hand, the electric car can also deliver power, covering the power demand of the home on a temporary basis. In this case, the high-voltage battery of the electric car will provide buffer storage. In the final resort, vehicle-to-home can both reduce the user's energy costs and make a contribution to network stability. In combination with the photovoltaic system it would even be theoretically possible to make the entire home autonomous in terms of energy. The entire system will be controlled and optimized by a digitally networked home energy management system (HEMS) combined with a bidirectional wallbox.

Vehicle to grid. Currently, the electric car as part of the general power grid is still a vision for the future. Apart from appropriate vehicles and wallboxes as well as amendments to the relevant legislation, it will also be necessary to make further investments in the digitalization of the power grid. Vehicle-to-grid will call for highly intelligent technical systems and harmonized interaction between a number of technical elements ranging from infrastructure to the vehicle itself. Where is excess power available? Where do bottlenecks occur? And what are the demand charges? All these aspects will need to be managed by the energy system of the future on a real-time basis. In this area, the automotive industry, power generators and network operators can only be successful together.