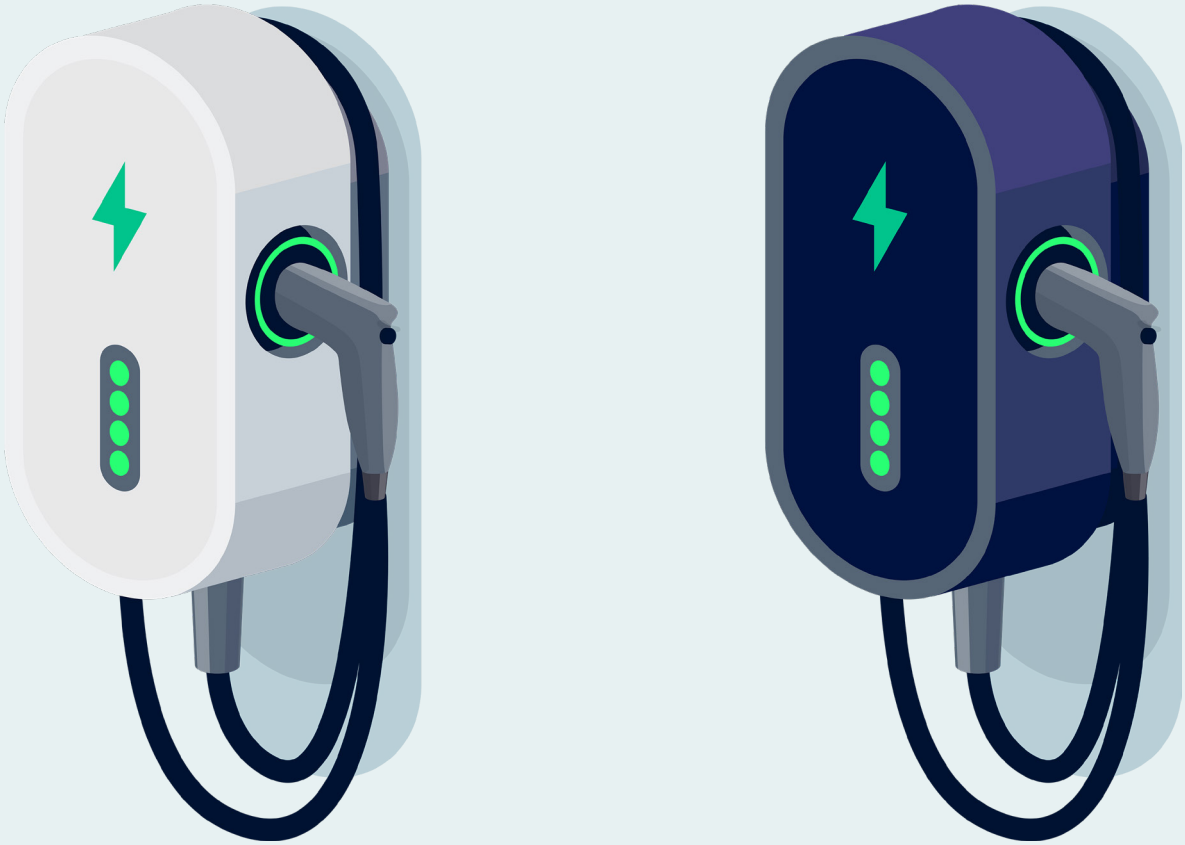
Wallbox Guide for Company Car Drivers:

Wallbox Guide – A Guide to Choosing the Right Wallbox for Home Use



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Guide

Home Wallbox for Company Car Billing

Practical tips and examples for fleet managers and company car drivers

The electrification of fleets is a key component of the energy transition in the transport sector. More and more companies are recognizing the benefits of electric vehicles: they are not only environmentally friendly but can also be cost-efficient when operated correctly. Home charging of electric company cars plays an important role in this.

This guide is a valuable tool for fleet managers and company car drivers who are considering purchasing a new wallbox or enabling their existing wallbox for billing to the company. It covers all aspects and requirements of home installation, such as the integration of a photovoltaic system. It offers practical advice and information based on the latest findings and best practices.

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1 Introduction

The Importance of a Home Wallbox

Charging a company car at home is the most convenient, yet also a very complex option compared to charging at public charging stations. Coming home, plugging in the vehicle, and starting the next morning with a pre-conditioned company car is a desire of many people to enjoy the benefits of electromobility.

The question of the optimal charging solution, which can also be used for automatic billing to the company, is complex and requires individual consideration. Several factors need to be taken into account, including:

- **Number of users:** How many people will use the wallbox?
- **Installation location:** Where should the wallbox be installed?
- **Integration of photovoltaic systems:** Should a photovoltaic system be integrated?
- **Home energy systems:** Is the integration of a complete home energy system desired?

There are various charging options for electric vehicles, including public charging stations, workplace charging stations, and home charging stations. These points are just part of the aspects that need to be considered when choosing the right solution.

2 What is a Wallbox?

Different Types and Their Applications

A wallbox is a charging station for electric vehicles that provides a safe and efficient way to charge an electric car's battery. Unlike conventional sockets, a wallbox allows for faster and safer charging, as it is specifically designed to meet the high demands of electric vehicles. For company car drivers, a wallbox is particularly important as it offers a reliable and convenient charging option directly at home or the workplace.

There are various models of wallboxes tailored to different needs:

Simple wallboxes

These models are primarily designed to ensure safe and fast charging. They are ideal for users who simply want to charge their vehicle without needing additional features.

Smart wallboxes

These wallboxes offer advanced features such as surplus charging and authentication. Surplus charging allows optimal use of electricity from a photovoltaic system by prioritizing vehicle charging when there is an excess of solar energy. The authentication function ensures that only authorized persons have access to charging, which is particularly advantageous for multiple users or publicly accessible installations.

Calibration law-compliant wallboxes

These are necessary for the legally compliant billing of the charged electricity. They meet legal requirements and enable accurate and transparent billing of charging processes, which is required for the reimbursement of charging costs by employers. They also usually offer the same benefits as smart wallboxes.

Simple and smart wallboxes can be enabled for calibration law-compliant billing with the Charge Repay Service.

The perfect wallbox for your needs

Choosing the right wallbox depends on various factors, such as individual charging needs, the availability of solar energy, and billing requirements. It is important to select a wallbox that not only meets current demands but is also future-proof and adaptable to new circumstances.

3 Local Conditions and Requirements

Requirements for Home Charging Infrastructure

To identify the requirements for your future wallbox, answer the questions below. You will then have a good overview of the points you need to consider.

1. Who will use the wallbox?

Wallboxes can be protected from unauthorized use in various ways. User authentication can be done via a key switch, an RFID card, or an app. Note that simple wallbox models do not offer authentication. The charging process begins as soon as the vehicle is connected.

When considering whether authentication is necessary for your wallbox, first consider the number of users. Will the wallbox be used only by you or by multiple people? For multiple users, authentication can be useful to control access and allow only authorized persons to use it.

Additionally, the **user group** is an important factor. For families or friends, simple authentication is often sufficient. In companies where employees and customers have access, more advanced authentication systems are often required to accurately allocate and bill electricity consumption.

Finally, the **location of the wallbox** plays a crucial role. In a private garage, authentication is often not necessary. In publicly accessible places, such as shared parking lots or underground garages, authentication is essential. This prevents unauthorized use and ensures security.

2. Where will the wallbox be installed?

When choosing a wallbox, factors such as accessibility and convenience, weather protection, and security play a crucial role, as they not only affect daily use but also have long-term impacts on the functionality and durability of the device.

Accessibility and Convenience are of great importance to ensure a smooth experience when charging the electric vehicle. A wallbox should be installed in a location that is easily accessible and provides enough space for parking the vehicle as well as for connecting and disconnecting the charging cable. This means that the wallbox should be mounted near the usual parking spot or in a garage to make the charging process as simple as possible. Whether you choose a wallbox with a fixed charging cable or one with a socket depends on the installation location and the available space. The position of the socket on the wallbox should also be considered accordingly.

Weather Protection is also an important aspect. Although most wallboxes are designed for outdoor use, their lifespan can be significantly extended by installing them in a sheltered location, such as under a carport or in a garage. This protects the wallbox from extreme weather conditions such as heavy rain, snow, and intense sunlight, which can cause wear and tear over time. Therefore, the resistance to local weather conditions should also be considered when selecting a wallbox.

Security is another critical factor. A wallbox should be installed in a secure location to prevent potential vandalism and unauthorized access. Additionally, it should be positioned in a way that it does not pose a danger to bystanders and cannot be easily damaged by vehicles. Security also influences the choice of the wallbox itself, as some models come with additional security features such as locking mechanisms that enhance protection against theft or misuse.

3. What charging power is needed?

When selecting the appropriate wallbox power class for charging electric vehicles, there are generally two common variants: **11 kW and 22 kW**. The choice of power class depends on both the technical capabilities of the vehicle and individual charging needs.

11 kW Wallboxes are usually sufficient for private use. An electric car with a battery capacity of 40 kWh would take about 3 to 4 hours for a full charge at a charging power of 11 kW. This makes them ideal for overnight charging, as most vehicles remain parked for longer periods, making charging time less of a critical factor.

22 kW Wallboxes offer higher charging power and can halve the charging time compared to 11 kW wallboxes. However, it is important to note that not all vehicles are designed for such charging power. The actual charging time depends on the vehicle's on-board charger. If a vehicle is only equipped with an 11 kW on-board charger, a 22 kW wallbox will

not provide any advantage in charging time. Therefore, the benefit of 22 kW wallboxes is limited, especially if the vehicle is charged overnight and the faster charging power is not needed.

Additionally, it should be mentioned that the installation of a wallbox with more than 11 kW in Germany is subject to notification and may require approval from the network operator, which can incur additional costs. For most applications, especially if the vehicle is regularly charged overnight, an 11 kW wallbox is therefore a cost-effective and practical solution.

4. What type of electricity will be used?

When charging an electric vehicle with a wallbox at home, you have the choice: charging with 100% grid electricity (electricity from the network operator) or with self-produced electricity from a photovoltaic system (PV system). This decision not only affects the environment and your electricity bill but also the choice of the wallbox itself.

Charging with 100% grid electricity means that you draw electricity directly from the public grid. If you choose this option, it is advisable to select a provider that supplies 100% green electricity. This ensures that your vehicle is powered by renewable energy, improving your car's CO2 balance. In this case, the wallbox itself can be a simple model, as no additional control technology is required for the use of solar power.

Self-produced electricity on the other hand, offers you the opportunity to become more independent from electricity price fluctuations and actively contribute to environmental protection. If you already have a PV system or are considering purchasing one, you should choose a wallbox that is intelligent enough to optimally use the self-produced electricity. Modern wallboxes can be configured to preferentially use electricity from your PV system when it is available and switch to grid electricity when the sun is not shining. This maximizes the use of your own electricity and minimizes your costs. However, there are some things to consider to ensure that the wallbox can actually communicate with the PV system. For more information, see "Special Feature: Surplus Charging" on page 11.

Looking to the future, it is advisable to choose a wallbox that is flexible enough to support future expansions such as a PV system. Even if you currently decide against a PV system, a wallbox that is future-proof can be a wise investment. This way, you remain open to changes and can benefit from technological developments and possible government subsidies.

5. Should charging processes be billed?

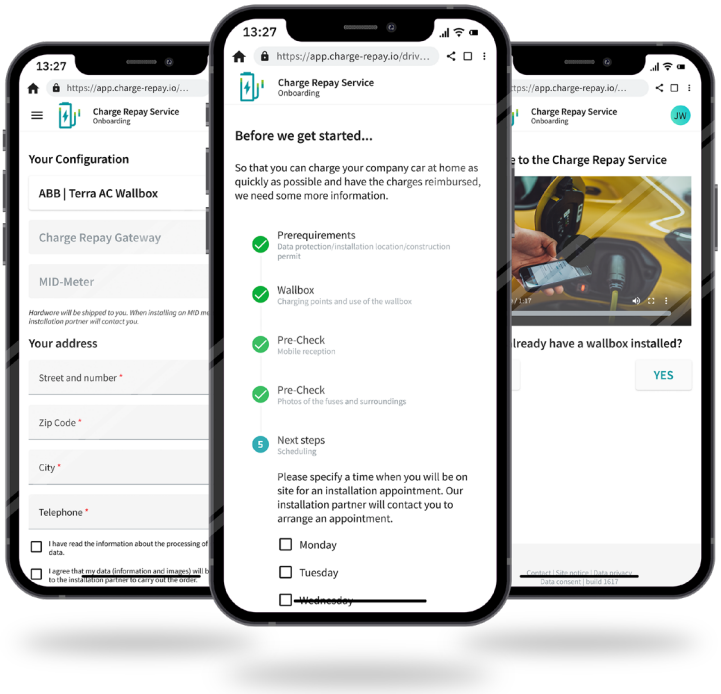
If you charge your company car at home and get reimbursed for the costs by your employer, precise and compliant billing of the charging processes is essential. There are two main ways to achieve this:

using a calibration law-compliant wallbox or retrofitting an existing wallbox with the Charge Repay Service from Phoenix Contact.

Calibration Law-Compliant Wallboxes are designed to meet legal requirements for measuring devices. They ensure that each charging process can be accurately recorded and billed. This accuracy is necessary to ensure transparent and trustworthy billing to the employer. If you choose a calibration law-compliant wallbox, you can be confident that the billing complies with legal regulations and will be accepted by your employer.

For wallboxes that are not calibration law-compliant, the **Charge Repay Service** offers a solution. This service allows existing wallboxes to be retrofitted to meet calibration law requirements. By retrofitting, an additional module is installed that precisely records the charging processes and prepares them for billing. This is a cost-effective alternative that allows you to continue using your existing wallbox while still ensuring correct billing. If no wallbox is available yet, the service also provides full flexibility in wallbox selection. For example, you can install a simple, cost-effective wallbox and enable it for billing with the Charge Repay Service.

It is important to coordinate with your employer in advance regarding the billing requirements and to choose the appropriate wallbox solution. This ensures that the billing of the charging processes runs smoothly and that you can easily get reimbursed for the costs. Also, keep in mind that legal regulations can change, so it is advisable to choose a wallbox that is future-proof and can adapt to new requirements.



4 Special Feature: Surplus Charging

How to Optimize the Use of Surplus Energy

The principle of surplus charging is an intelligent method to charge electric vehicles with excess solar power that is not consumed in the household. For efficient use of solar power, the wallbox must be able to detect when surplus power is available.

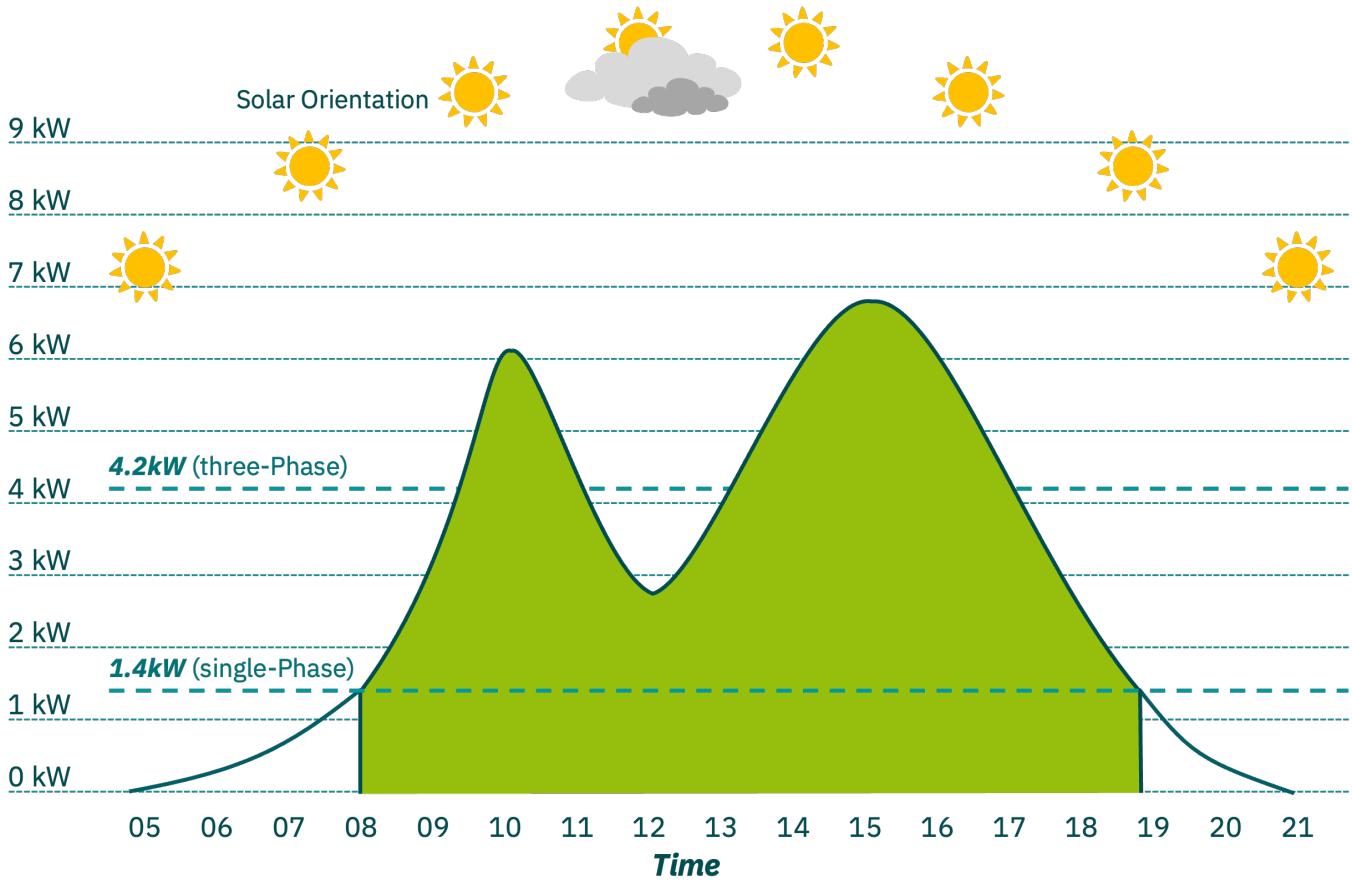
Surplus power refers to the electrical energy generated by a photovoltaic system (PV system) that is not immediately consumed in the household. When the sun shines, solar cells often produce more electricity than is needed at that moment. Instead of feeding this surplus power into the public grid, it can be used to charge the electric car. This maximizes the use of the renewable energy source and reduces dependence on the power grid. Surplus charging is therefore an efficient method to optimally use self-produced electricity and reduce energy costs. It is a key element for sustainable and self-sufficient energy supply in the field of electromobility.

There are various technical solutions for this:

Integrated meter: Some wallboxes have an additional meter that measures whether and how much electricity is being fed into the public grid. If electricity is being fed into the grid, the wallbox starts the charging process or increases the power..

Data connection to the inverter or home energy system: Other wallboxes can establish a direct data connection to the PV system's inverter or the home energy system. This connection allows the wallbox to detect in real-time when surplus power is available and to control the charging accordingly.

The challenge with this technology lies in compatibility: there are no standardized communication protocols between wallboxes, inverters, and energy management systems. This means that a wallbox technically capable of surplus charging may not necessarily work immediately with every inverter or system. It is important to check before purchasing whether the chosen wallbox is compatible with the existing PV system and its components or if additional adjustments are required. Ideally, consult the electrical engineering specialist for your PV system for advice.



5 Choosing the Right Wallbox

The Perfect Wallbox for Your Needs

After answering the questions regarding users, installation location, power source, and billing of charging processes, we can recommend a suitable wallbox for your needs.

For users who prefer a simple solution without additional features, a basic wallbox is sufficient. It offers safe and fast charging. If you need billing for charging processes in the future, **basic wallboxes** can be retrofitted with the Charge Repay Service to enable calibration law-compliant billing.

Smart wallboxes offer advanced features such as surplus charging and authentication. They are ideal for users who want to optimally use their self-produced solar power or when multiple people use the wallbox. Smart models can also be retrofitted with the Charge Repay Service if calibration law-compliant billing becomes necessary.

If you have a large user group, you should consider a **calibration law-compliant wallbox**. It meets all legal requirements for transparent billing of charging processes and can also be used for billing with other systems.

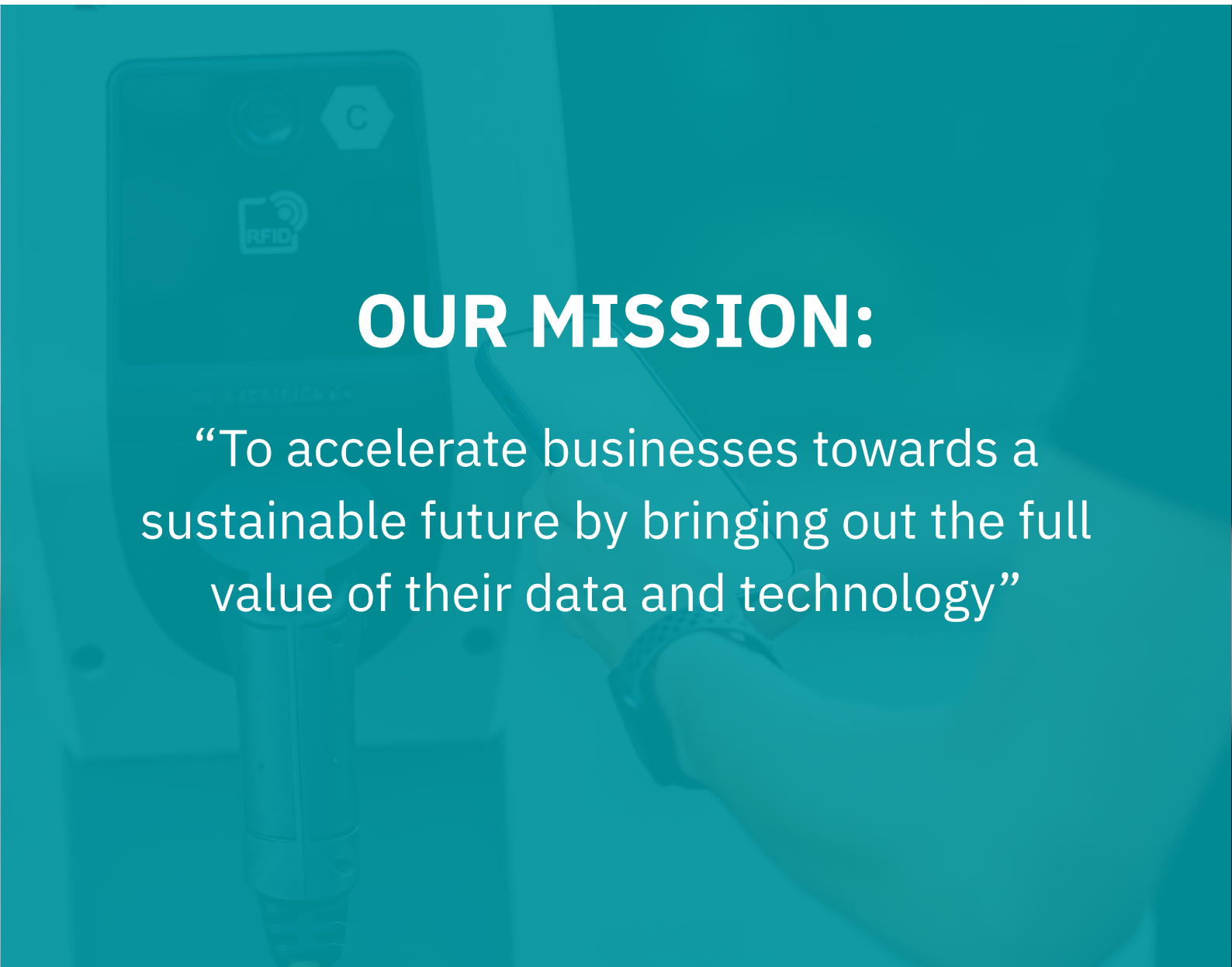
The installation should be in a location that is both accessible and secure. Ensure that the wallbox is protected from the weather and unauthorized access. The proximity to your power connection can also affect installation costs.

In summary, we recommend a wallbox that meets your specific requirements while allowing for future adjustments. Consider the technical compatibility with your PV system and other home energy systems to ensure smooth integration.

8 Conclusion

In summary, choosing the right wallbox requires careful consideration of individual needs and circumstances. Whether it's a basic wallbox at low cost, a smart wallbox for surplus charging with solar power, or a calibration law-compliant wallbox for large user groups – each option has its own advantages and requirements.

By answering the key questions – who will use the wallbox, where it will be installed, what type of electricity will be used, and whether the charging processes need to be billed – you can make an informed decision. Additionally, the Charge Repay Service offers a flexible way to retrofit non-calibration law-compliant wallboxes to enable legally compliant billing.



OUR MISSION:

"To accelerate businesses towards a sustainable future by bringing out the full value of their data and technology"

Phoenix Contact Smart Business GmbH is the center of excellence for cloud services and data analytics for industry.

A growing team of currently more than 30 employees in Berlin, Bad Pyrmont and India is developing standardized and scalable software-as-a-service solutions – known as smart services – to enable small and medium-sized companies to fully exploit the advantages of digitalization and the Industrial IoT. Phoenix Contact Smart Business GmbH develops cloud services for the entire Phoenix Contact Group in the areas of development, operation and sales: software-as-a-service.

The goal: smartification made simple!

The core competencies of Phoenix Contact Smart Business: cloud technologies, data analysis, software services

Cloud-based services based on industrial IoT technologies enable users to get an overview of the status of their devices and systems – from anywhere, at any time. By using various algorithms for forecasting, optimization and analysis, users of Proficloud.io and Smart Services manage operating and maintenance processes as efficiently as possible. Thanks to Smart Services, you can reduce downtime and optimize (redundant, manual) workflows through remote monitoring.

About Phoenix Contact

Phoenix Contact is a global market leader based in Germany. Our group stands for pioneering components, systems and solutions in the fields of electrical engineering, electronics and automation. A global network in more than 100 countries and 17,600 employees ensures that we are close to our customers, which are particularly important to us.

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