

# check-list

## for the implementation of charging infrastructure for electric vehicles at touristic sites within the Alpine region

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## 1. Introduction and background information

This checklist has been elaborated by the technical office for spatial planning „im-plan-tat“ on behalf of the association „Alpine Pearls“ within the project „E-MOTICON“ (*e-Mobility Transnational strategy for an Interoperable Community and Networking in the Alpine Space*). Further details on this project can be found by taking a closer look at the website available under <http://www.alpine-space.eu/projects/e-moticon/en/home>.

As mobility planners, who were already able to support almost 300 companies and a large number of municipalities and regions in the successful implementation of measures in the field of (e-) mobility, the planning office im-plan-tat was now working - on behalf of the Alpine Pearls association - on the subject electromobility in the Alpine area and in particular e-charging infrastructure from a tourist point of view. It is the aim to develop a transnational, interoperable and area-wide charging network at touristic municipalities and regions within the Alpine space. These charging opportunities have to be supplied in the longrun solely by the use of renewable energies (green electric).

This check-list has been developed based on the information provided by the municipalities being part of Alpine Pearls. Their experiences as well as questions that still remained open so far as regards to the proper implementation of charging infrastructure were taken into account. Based on these information this document shall provide guidelines and tips as regards to the successful implementation of charging stations.

Overall, more than 80 touristic hosts (hotels, guesthouses, apartments, farms, camping sites etc.) are located within 25 municipalities that can be referred to as „Alpine Pearls“ members within Germany, France, Italy, Austria, Slovenia and Switzerland.

The future charging processes of the guests of these 25 Alpine Pearls members are supposed to take place directly at their accommodations. Due to this reason, the preparation of information needed by the hosts to install such a charging possibility successfully was of major importance. Additionally, establishing charging opportunities at so-called „touristic hotspots“ within the municipality and / or region is therefore dealt with in this document.

Based on a frame tender it was possible to receive various offers from numerous charging station providers. The best three offers (based on a thorough assessment of the criteria stated in the frame tender) are subsequently outlined in more detailed. As a consequence, every touristic institution can decide on the product that is best fitting its needs and requirements.

At the end of the document, a short note to summarize the main points of this checklist is provided. By using the most important keywords, this document summarizes the most important aspects and further acts as a guideline for the successful implementation of the charging station.

Finally it is important to note that this document only provides a framework and general guidelines. The specific actions that are required on site have to be aligned with the charging station provider, with a local electrician, with the grid operator and – in case that the charging station is planned to be set up in the public – with the authority responsible. The respective national guidelines, norms and laws thereby have to be taken into account on an obligatory basis.

## 2. Why is the implementation of charging infrastructure for touristic purposes worthwhile?

*„since the electromobile guest is arriving sooner as you can imagine. This development has to be considered actively. For touristic locations this is a challenge, but it is also a chance for the future.“*  
(Heimo Aichmaier, Austrian Mobile Power)

*„because electromobile guests decide on their holiday destination based on the charging infrastructure that is available. [...] many hotels and restaurants already try to attract this growing target group. In addition to that, classical holiday ideals like for instance silence, nature and relaxation can be applied directly to electric mobility as well.“* (Bayern innovativ)

These two quotations indicate the growing importance of electric mobility within the field of tourism and reflect the growing number of experts arguing in a similar way.

In addition to being able to **acquire new customers** (as electric car drivers can be attracted if a proper charging infrastructure is available), the implementation of charging stations for touristic needs offers numerous further advantages.

People that are driving electric cars are usually wealthier. As a consequence, they are not only responsible for **sales increases** due to the services they consume (i.e. payment of charging processes), but also for the added value they create during their stay due to their awareness for higher quality (i.e. as regards to the accommodation, food and trips).

For purchasing a proper charging station, attractive regional and / or national **subsidies** are usually available. Partially, financial **grants** can be also used for preparational activities (i.e. electrotechnical preparations).

A company / a municipality is able to create an USP (=unique selling proposition) by implementing a proper charging infrastructure. Thereby, an increase in their competitiveness can be expected. Furthermore, a **positive and sustainable image** can be created by enforcing actions related to electric mobility. Companies can therefore position themselves as especially innovative.

## 3. What has to be considered when implementing a charging infrastructure for cars within the field of tourism?

### 3.1. Building permits

The intention of realising a charging station may has to be permitted by considering building law or has to be reported to the authority responsible. This has to be clarified in advance by taking into account the relevant national conditions. Thus, it is important to consider enough time in advance that may be needed for an official process.

#### Example of Austria:

The need for an approval procedure depends – according to the „guidelines for companies – approval procedures for charging infrastructure for electric vehicles“ that has been published by the Federal Ministry for Transport, Innovation and Technology – on the local conditions or mode of execution. If this is not perceived as unusual or dangerous for instance, the project does not need

any authorizations from a trade law perspective. Nevertheless, it is still recommended to contact the responsible authority in order to clarify whether there is an duty to obtain a permission or not for this individual project.

In Austria, the responsible authority for building methods is the local major respectively the municipality. Charging stations that are commercially used reside with the commercial law of the federation, the responsible authority is the district authority or the magistrate/municipal district office.

Procedure of the building approval from the „Leitfaden für Betriebe - Genehmigungsverfahren Ladeinfrastruktur für Elektrofahrzeuge“ ("Guideline for companies – approval procedures charging infrastructure for electric vehicles"), Austrian Federal Ministry of Transport, Innovation and Technology, March 2017:

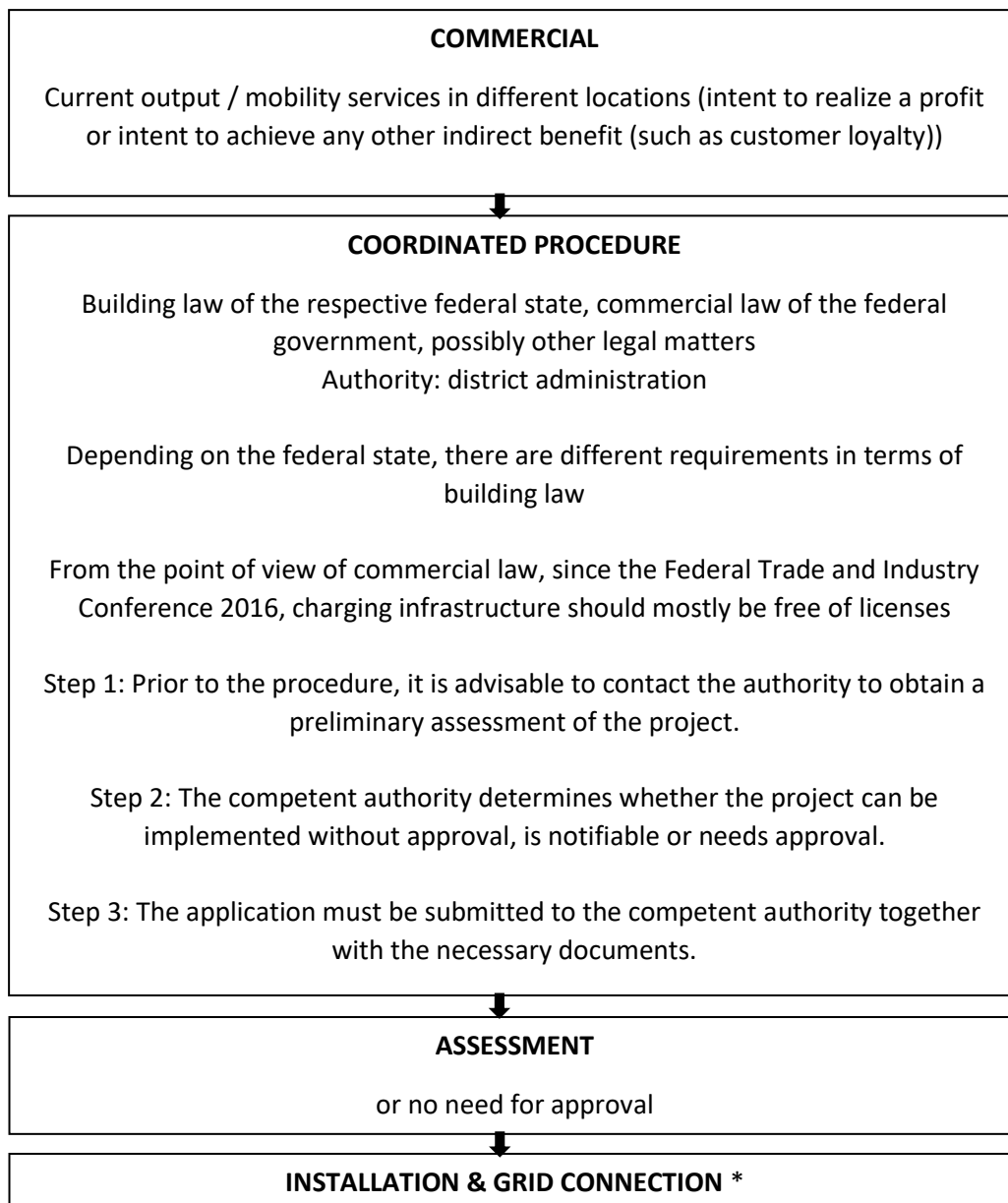


Figure 1: Procedure of the building approval from the „Leitfaden für Betriebe - Genehmigungsverfahren Ladeinfrastruktur für Elektrofahrzeuge“ ("Guideline for companies – approval procedures charging infrastructure for electric vehicles"), Austrian Federal Ministry of Transport, Innovation and Technology, March 2017

\* The connection to the public supply network must be made by a licensed electrician who has to comply with special technical requirements (TAEV <http://akademie.oesterreichsenergie.at/taev.html>). The design of a charging station is internationally standardized (for example, ÖNORM EN 61851), therefore electrical engineering aspects during installation and operation are fully regulated. Depending on the connected load, additional electrotechnical legal matters may be required in this regard (eg EIWOG, state EIWOGs, etc.)

For commercially used charging stations in Austria the following regulations have to be considered:

If there is already an operating licence/plant permission existing (i.e. for a hotel, trade), the trade regulation act provides the possibility to report the change of the existing operational plant.

§ 81a Abs. 2 der GewO 1994 says: „a change in an operation/business (that is a change in the condition or functionality or the extension of an operation/business that could have an impact exclusively on its surroundings) has to be reported to the responsible authority by the owner four weeks in advance [...]“

Usually, the notification sent to the trade authority by the operator or constructor of the charging station is acknowledged in practice.

Likewise, a charging station that is situated on a public parking space (i.e. from the municipality, a motorway service area or approved parking lots from commercial enterprises) is usually acknowledged if a notification from the operator or constructor is sent to the trade authority. Further information about the project, i.e. technical descriptions or a site plan, should be sent to the trade authority in advance.

If, on the contrary, a charging station is planned to be implemented directly within a so-called „meadow“, an entire approval procedure is required, as usually further services accompany such an offer like for instance catering, trade etc.

### **3.2. Electrotechnical groundwork**

Before implementing and purchasing a charging station, adequate electrotechnical preparations need to be effected. Fundamental aspects that have to be considered are for instance the requested loading capacity and the connected load that is indeed available already.

If the mains connection has to be established or the grid capacity has to be increased it is essential to pay attention to the requirements of the grid operator. If a charging station with more than 7,4 kW loading performance is planned to be implemented for instance, the grid operator has to be informed about that in advance. This has to be ensured whether the charging station is located in public (i.e. at a touristically relevant place) or within a private area (i.e. hotels). The specific regulations as regards to the connection have to be discussed with the grid operator in detail. Frequently, a mains connection that is based on the use of three phases is compulsory from 7,4 kW onwards, sometimes even starting at a loading performance of 4,6 kW.<sup>1</sup>

As regards to the connected load (that can be determined by taking a closer look at the invoices from the grid operator or by directly contacting your contact person) it is important to make sure that it is sufficient and that there is enough capacity left for the charging station and the power it is assumed to offer. In particular, it is essential to take into account every single consumer that is also using the same connection. Especially highly demanding devices like they are used in kitchens and spa areas of hotels have to be paid attention to when observing peak loads. It is important for the satisfaction of

<sup>1</sup> Source: energielösung GmbH: Tips for the installation of e-charging stations, March 2018, available at: <https://www.energieloesung.de/installstipps-e-ladestation>

the guests to guarantee that even when the general energy demand is high there is still enough capacity left for an unproblematic usage of the charging infrastructure. The specific details about loads and their effects have to be discussed with an electrician in advance in order to be able to provide the installed power that is then indeed needed.

The charging capacity and the thereby related installed power has to be further in line with the location where the charging infrastructure shall be implemented and the amount of time that a guest will spend in order to charge his / her car. If the guests are supposed to remain at the charging station only for a short amount of time (i.e. just for a short break) it is recommended to provide a higher amount of power in order to be able to recharge the car very fast. At locations where the guests may spend more time as for instance at their hotels, a lower amount of power is needed in to recharge the car (i.e. during the night).

In order to guarantee that the grid will not have to struggle with overloads due to the activation of the charging facilities, an appropriate permission from the grid operator has to be obtained. This permission can be requested by the electrician for instance. Of course, one can organize that by oneself as well.

Before installing a charging station it is important to check whether enough space is left in the switching cabinet. A separate fuse for an electric circuit for the charging station has to be effected. It has to be considered that each charging station is equipped with its own supply cable. To what extent wallboxes need their own supply cable, i.e. if two wallboxes are placed on one stela has to be clarified with the vendor and / or manufacturer. Nevertheless, it is possible that each wallbox needs a separate supply cable and is thus equipped with its own circuit breaker as well as an adequate fault-current circuit breaker.

Before implementing a charging station it is further necessary to question the protection devices needed and to examine the protection categories. The charging station provider displays the protection categories for each charging station separately. Depending on the protection categories it is important to consider where to locate the charging station. It is for instance essential to place a charging station in a way that it is protected from bad weather conditions when the protection category recommends it.

A safeguarding of the power supply line by using a circuit breaker depending on the charging capacity is obligatory. Thus, it can be prevented that electricity lines warm up because of too much power as the switch then breaks the circuit. It has to be controlled in advance to what extent such a protective switch has already been integrated or is still necessary to be implemented.

Furthermore, a fault-current circuit breaker has to be installed (at least if nothing with a similar function (i.e. a switch featuring protective measures against DC residual currents) is already part of the charging station). It is recommended to decide on an installation of a fault-current circuit breaker type B. Although this is more expensive than relying on a simple one belonging to type A, it is much more safe as this switch detects each kind of residual current. Inlet and outlet power flows are compared and the circuit is broken whenever an imbalance is found.

If a charging station is protected by the use of a fault-current circuit breaker type B, each preconnected fault-current circuit breaker has to be equipped with a means to detect DC fault currents or has to be a type B itself (even if it does not belong to the charging station).

It is recommended to contact the manufacturer of the charging station in advance as well as an electrician in order to be able to discuss details about potential additional measures and protection systems that may already be installed.

As regards to the meters in the switch cabinet it has to be paid attention to the number of meters that are already available and if there are diverging subscription rights existing. Moreover, the type of the meters already in use have to be determined.

Particularly, meters can be classified as follows: ferrari counters, electronic meters featuring loading profiles and those who do not.

Depending on the type of meter the power that has been consumed is assessed and finally settled:

- ferrari meter – by using this meter, no peaks are determined; As a consequence, the implementation of a charging station is uncomplicated (as long as the meter is not replaced)
- electronic meters that do not feature loading profiles are today's standard Particularly, the highest quarter-hourly value within a month is saved. Over the year, the values of each month are summed up and then divided by 12. The result is then the amount that is finally settled.

As a consequence of the implementation of a charging station, however, this results in a charge of up to 10 kW.

Therefore, with these types of meters it has to be questioned whether the charging stations should be operated single-phase only. Thus, the vehicle would e.g. be charged at night with a low charging power (applicable in hotels, for example) and there would be no increase in purchased power.

- Electronic meters that feature loading profiles (see above) By using such a meter it is recommended to implement a load management in order to avoid peaks.

Besides, it is essential that the dimension of the power line is sufficient (wire size!). The charging station has to be connected separately starting from the fuse box without any further users that are connected to the power line. The power line used has to be suitable for the charging performance that it is needed for. Depending on the charging capacity and the cable length (distance between charging station and distribution box) there is a certain wire size that has to be guaranteed. This wire size is also related to the temperature at the charging station (i.e. in a garage) and several further factors.

Approximate guide values as regards to the dimension of the power line are offered by the following table. Nevertheless, it has to be guaranteed that the local conditions are taken into account by involving an electrician. Depending on national norms and guidelines, the values within this table can deviate as these figures are related to examples of ÖNORM (Austrian norms).

3,7kW		
cable length	cable cross-section	pipe diameter*
0 - 15m	3 x 2,5mm <sup>2</sup>	16mm
15 - 24m	3 x 4mm <sup>2</sup>	16mm
24 - 36m	3 x 6mm <sup>2</sup>	25mm
36 - 60m	3 x 10mm <sup>2</sup>	25mm
60 - 190m	3 x 16mm <sup>2</sup>	40mm

max 1,5% Δu  
max 1,5% Δu  
max 1,5% Δu  
max 1,5% Δu  
max 3,0% Δu

11kW		
cable length	cable cross-section	pipe diameter*
0 - 30m	5 x 2,5mm <sup>2</sup>	20mm
30 - 48m	5 x 4mm <sup>2</sup>	32mm
48 - 73m	5 x 6mm <sup>2</sup>	40mm

max 1,5% Δu  
max 1,5% Δu  
max 1,5% Δu



73 - 122m	5 x 10mm <sup>2</sup>	40mm	max 1,5% Δu
122 - 390m	5 x 16mm <sup>2</sup>	50mm	max 3,0% Δu

22kW			
cable length	cable cross-section	pipe diameter*	
0 - 61m	5 x 10mm <sup>2</sup>	40mm	max 1,5% Δu
61 - 97m	5 x 16mm <sup>2</sup>	50mm	max 1,5% Δu
97 - 152m	5 x 25mm <sup>2</sup>	50mm	max 1,5% Δu
152 - 427m	5 x 35mm <sup>2</sup>	63mm	max 3,0% Δu

44kW			
cable length	cable cross-section	pipe diameter*	
0 - 76m	5 x 25mm <sup>2</sup>	50mm	max 1,5% Δu
76 - 106m	5 x 35mm <sup>2</sup>	63mm	max 1,5% Δu
106 - 152m	5 x 50mm <sup>2</sup>	63mm	max 1,5% Δu
152 - 427m	5 x 70mm <sup>2</sup>	63mm	max 3,0% Δu

\* by ÖNORM E 6599

### 3.3. Technical equipment of charging stations

AC charging stations for use in tourist areas should be equipped with the European standard plug - a type 2 plug. This ensures that as many different vehicle models as possible can be charged at the charging station. It should also be considered that the charging station does not have a charging cable connected to the charging station, if possible, but only a charging socket. This is important so that - depending on the vehicle-mounted plug - also an adapter cable can be used, should the vehicle not have a type 2 plug vehicle-mounted.<sup>2</sup> For example, it is therefore also possible to charge a car which has a type 1 plug vehicle-mounted if the user carries along a corresponding adapter cable.

The charging station should also have all the necessary protective equipment (line circuit breaker, fault-current circuit breaker, etc.) to avoid retrofitting of safety equipment outside the charging station.

An integrated meter is also recommended for tourist use in order to be able to comprehend the individual charges.

### 3.4. Placement of charging stations

If charging facilities are to be provided for guests, it is of primary importance with regard to the placement of the electricity charging station that it is an attractive and relevant location for tourists. Tourism-related points such as hotels, restaurants, tourist information, attractions, recreational facilities (such as swimming pools, spas, sports centers), starting points for tours (such as hikes, ski tours) or other points of interest are particularly suitable for the implementation of charging options. Depending on where the charging station is placed, there are specific requirements regarding the equipment of the charging station. For example, at places with a longer residence time a lower charging power per charging point is sufficient, in places with a short residence time a higher charging power is necessary.

<sup>2</sup> Currently the newer models increasingly also have a Type 2 plug on the vehicle side. So far, however, certain car brands (for example: Nissan, Citroen) were equipped with a Type1 plug vehicle-mounted.

When choosing the location for a charging station in public areas, it must always be taken into account that there are attractive offers in the surrounding area for an enjoyable pastime during the charge, such as a rest point or shopping opportunity.

In general, any expansion of the charging station should be taken into account when it comes to locating a charging station. Is there more space / are there additional parking spaces, which can be used in the course of a future expansion of the charging station?

Before placing a charging station, it has to be considered that there are no restrictions on traffic safety or accessibility as a result of the implementation of the charging station. In each case, the predefined minimum distances to the road, bike paths and sidewalks must be satisfied. In addition, there must not be any conflict with the trees, the city furniture, the canal or other supply lines.

When placing charging stations, care must also be taken to ensure that the length of the power line, ie the distance from the charging station to the next distribution box, is as short as possible. Depending on the cable length, the necessary cable diameter is calculated (see chapter "Electrotechnical groundwork"). The longer the cable and the higher the power output of the charging point, the larger the cross section of the cable needs to be.

In this context, it is also relevant to determine if it is necessary to open up the asphalt for the laying of the power line or whether the laying can take place, for example, on a green area. In general, the shortest possible distance to the next distribution box must be selected.

Or is there already an empty piping, which can be used? This must be checked in advance. It should also be ensured that there is still enough space in the pipe.

Is it necessary to cross foreign property when laying the power line? This must also be checked in advance and, if necessary, legally clarified.

When placing the charging station, it is essential to take the protection class into account. The respective protection class can be requested directly from the manufacturer of the charging station. If the charging station is not waterproof according to the protection class, it is necessary to provide appropriate weather protection where the charging station will be placed. In particular, in the case of projects for the placement of charging facilities in public areas (for example in parking areas in the outer area), it is essential to check the protection class beforehand.

As soon as the approximate location for the charging station is fixed, the detailed planning of the location is essential. It should be noted that the charging station should always be placed on the side of the parking lot where the charge socket is located on the vehicle. The individual vehicle models have the charging sockets at different points on the car. Often these are located in the front, but also occasionally on the rear, either left or right (where the fuel tank cap can be found on the fossil-fueled vehicle). However, since the tourist charging station differs from privately used charging stations and many different vehicle models want to be charged here, it is advisable to adjust to different circumstances. Example: The placement of a charging station on the edge, in the middle between



**Figure 2: Charging station with ram protection installed in the middle between two parking spaces and corresponding signage of the charging station and the associated parking spaces (Source: im-plan-tat)**

two parking lots (with sufficient maneuvering area in front of the parking spaces) allows the car-owner to either select the right or the left parking lot, either forwards or backwards, depending on where the charging socket is located on the car.

With regard to the parking space, it must always be checked if it is accessible twenty-four-seven (in the optimal case there should be no barrier in the parking lot on which the charging station is to be implemented in order to prevent a time restriction on the possibility of use) and that the parking space and the associated infrastructure comply with the Highway Code.

A solid ground (foundation) or a suitable wall for the installation of the charging point must be available. In this context, if the ground is unpaved, a suitable foundation must be created beforehand. Charging stations without anchoring on the ground or charging stations without a stela – the so-called "wall boxes" - can be mounted on the wall or at another secure facility. In this case, the wall or the facility should be able to carry the weight of the charging station safely.

If, for example, flammable or even explosive goods are stored at the or near the intended location for the charging station, it is urgently recommended to refrain from installing the charging station at this location.

Especially for charging stations which are used on a daily basis by people who are not familiar with the local conditions (tourists), an external protection of the charging station should be installed. A ram protection or a protective casing prevent damage to the sensitive charging station caused by driving against it.

Also recommended are lighting and weather protection of the charging station, to provide an even more comfortable charging experience for the guests.

If there is a need for a smart charging station, an internet connection is mandatory. It must therefore be ensured that a connection to the Internet is available or possible in the area of the charging station. A connection is possible via W-LAN, via a LAN cable or via mobile communications.<sup>3</sup> If necessary, this should be coordinated with an internet provider. It is also important to ensure that the location of the charging option has correspondingly good reception and the reception is not being disturbed.

### ***3.5. Billing of charging processes***

Electricity is a valuable asset and should therefore not be given away for free. The charging of electricity should therefore not be free. The operating costs as well as the corresponding expenses for the infrastructure production should be covered.

In relation to charging stations it should be differentiated between site owners and charging station operators.

**Site owner:** Owner of the charging station, autonomously purchases the charging station and pays for it. The owner receives a fee from the operator for the use of the infrastructure. The owner acts as applicant if a funding for the charging station is submitted.

**Charging station operator:** handles the operation and billing between customers and site owners. For the service of billing, the operator retains a certain share of the revenue generated per charging station. Is owner of the trade to operate the charging station.

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<sup>3</sup> Depending on the manufacturer of the charging stations, the possibilities are different here!

The customers charge electricity at the charging station and pay for the service to the operator. The operator provides the customer with an invoice for the use of the charging station.

Charging station owner and operator can also be the same person / institution.

In order to be able to charge the individual load processes of guests, the charging station must be equipped with a corresponding billing system. The consumed current can usually be charged according to kilowatt hours and / or according to time. Depending on the system, charging stations in the public area usually require a membership of the respective charging station provider in order to be able to charge the consumed current.

In the context of this membership one receives for example a RFID card or other access options to start the loading process and this will be charged via the member account.

In the case of charging stations which are used in the tourism sector, it is generally advisable to create an access which is possible regardless of memberships with providers, ie barrier-free. Otherwise, it would be necessary that the guest applies for different memberships in advance, depending on the holiday destination and existing charging stations from different providers. This is not only expensive, but also very tedious.

It is advisable to implement a convenient payment option via credit card / debit card / PayPal in the public sector.

Also regarding charging stations, which are e.g. used in hotels, the handling and billing of the charges should be as uncomplicated as possible in order to offer guests a pleasant charging experience. Here it is recommended to allow billing of the charges on the guest room invoice in the form of a service fee.

It can also be assumed that charging stations financed by fundings must ensure barrier-free access, ie. that the charging must be possible without any membership.

**Concerning billing of loading processes attention must be paid to the respective national legal conditions!!**

Example Austria:

In Austria, the Electricity industry and Organizational Law („ELWOG“), which regulates electricity production and electricity trading, applies.

However, the operation of charging stations is not an activity that qualifies as the operation of an electricity company within the meaning of § 7 (1) no. 11 ELWOG. Charging stations are therefore, insofar as they are operated commercially, within the scope of the Industrial Code.

This means for operators of charging stations, that they are not subject to the regulated scope of the ELWOG, but the Industrial Code. The current can be passed on to customers also at extra cost in the form of an ancillary right or a free trade.

In addition, the contract conditions with the network operator have to be considered in this context. It is noted here that the network operator provides the network customer with the network



Figure 3: Charging station with RFID field (Source: im-plan-tat)

connection only for his own purposes and that it requires the written consent of the network operator for the connection of third parties (end users).

### 3.6. Load management

Load management can be optionally obtained as part of the purchase of a charging station as an additional function and it offers many benefits.

A load peak means a short-term high demand for power in the power grid. For example, a peak load may occur when multiple electric vehicles are charged with electricity at the same time and / or when there is a general high power demand (e.g. in a hotel with kitchen, spa area, etc).

Load peaks in the load curve can be shifted by appropriate load management. This works in such a way that the charging processes of the vehicles are started when the other connected consumers just need little power. So generally less connected load is required. Especially for tourist hosts, which also have other large consumers, such as kitchens or spa areas (sauna, etc.), load management is recommended.

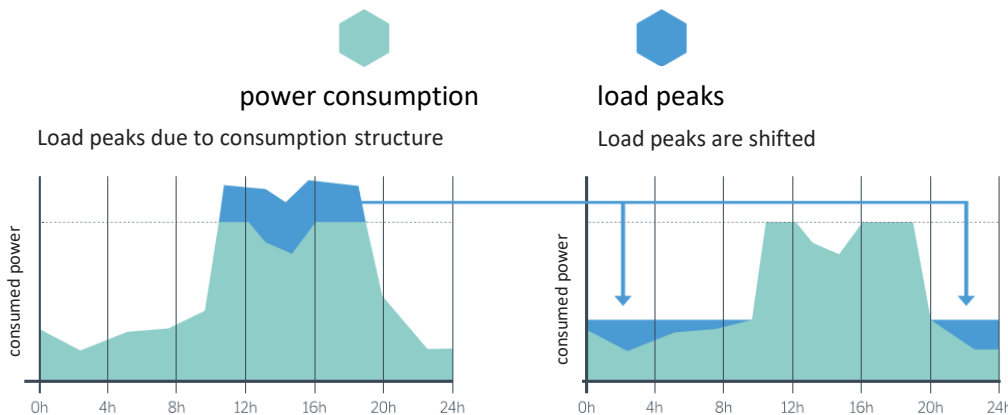


Figure 4: Operating principle of load management (Source: <https://orsted.de/energieloesungen/energielexikon/lastmanagement> in German; English translations have been added into the figure)

Load management is already offered by most manufacturers as standard. There are different types of load management: static, dynamic and timetable-based load management.

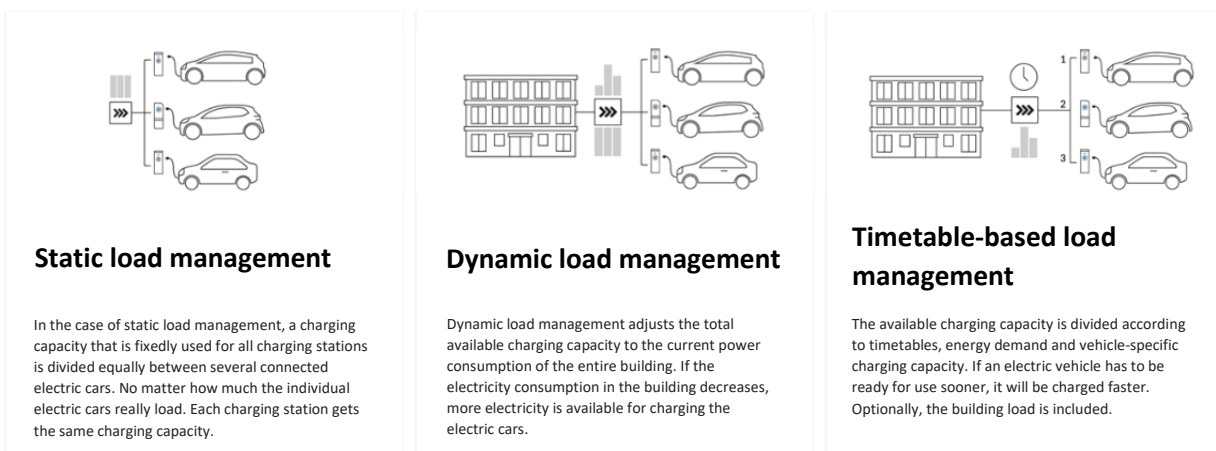


Figure 5: Different types of load management (Source: [https://www.mobilityhouse.com/de\\_de/lastmanagement\\_in\\_German](https://www.mobilityhouse.com/de_de/lastmanagement_in_German); English translations have been added into the figure)

### **3.7. Use of electricity from renewable energies**

The share of electric vehicles in total car sales is growing steadily. In order to be able to operate the e-vehicles in a way that is environmentally friendly even during their lifespan, they must be charged with more sustainable - "green" - energy.

Much of the energy needed in mobility comes from fossil energy sources. The combustion of energy sources, which are produced from fossil raw materials, creates unimaginably large amounts of greenhouse gas emissions as well as toxic emissions to humans.

Only electric cars powered by renewable energy sources can help combat climate change and improve the quality of life. Unlike fossil energy, electricity from renewable energy can be provided not only sustainably but also regionally.

The demonstrable origin of electricity from power plants without combustion technology (for example, from their own PV system, wind power or hydropower) is to be aimed at as part of the implementation of charging stations and must also be partially set out in the course of applying for funding for the implementation of charging infrastructure. If the direct electricity purchase e.g. via a PV system is not possible, a contract with an eco-electricity provider may otherwise be submitted.

### **3.8. Costs**

Concerning costs associated with implementing a charging facility, the following items should be considered:

- if necessary, costs for the grid connection / extension of the grid connection or the grid connection power
- preparatory work by the electrician and, if necessary, excavation work & foundation construction
- purchase of the charging station itself (hardware and software)
- accompanying measures, such as labeling of the charging station, ram protection, etc.
- ongoing operation / maintenance of the charging station

The costs for the grid connection depend on the existing connected load and the charging capacity to be achieved at the charging station. The current connected load is usually found on the bills of the network operator. The network operator should generally be contacted before a charging station project. If the available connected load is insufficient to operate a charging station, additional power must be purchased. The price depends on how many kilowatts of power have to be purchased to ensure operation of the charging station.

The installation costs of a charging station are highly dependent on the local conditions. Is there already an empty piping that can be used or does a new pipe have to be laid? Is it necessary to open up the asphalt to lay the power line? And so on. But also the equipment of the charging station is crucial for the further necessary electrotechnical measures. Are circuit breakers already installed in the charging station or do they still have to be installed? What charging capacity can / should be achieved with the charging option?

The purchase costs of a charging station depend on different aspects. For example wall boxes for wall mounting are usually cheaper than charging stations mounted on the floor. It is also decisive which charging capacity should be achieved and which other functions the charging station should have. Charging stations in tourism are - unlike privately used charging stations - usually provided with an



access and billing system to compensate for the charges of users. With regard to the initial cost of the charging station, this additional item should be included. Furthermore, the charging station should have additional functions when used in the tourism sector, such as a monitoring function of the charging processes, optional load management, etc. - these additional functions also need to be considered in the purchase costs.

Especially if charging facilities are installed in the public area, there are also accompanying measures necessary, such as the labeling of the charging options, a corresponding ramp protection, promotion of the charging station (for example, registration of the charging station in charging stations platforms) etc.

The costs for the operation of the charging station are to be paid directly to the operator and are usually billed monthly or annually. In addition, costs for maintenance or repairs may be incurred, but these are usually included in the price.

### ***3.9. Funding opportunities***

At present, there are usually very attractive national or regional funding opportunities regarding the purchase of charging infrastructure or possibly also the necessary preparatory measures for private people as well as for companies and public institutions. For detailed information on current funding opportunities, contact a regional e-mobility expert or contact the charging station provider directly.

Before installing the charging station, it should be clarified which funding possibilities are currently available at national or regional level and what the funding conditions are. In some cases, subsidies must be applied for before the charging station is implemented, but in some cases only after the implementation. It is absolutely necessary to ensure that the time frame conditions are met in order to be able to take advantage of the financial support. Furthermore, with regard to funding conditions, attention must also be paid to how the charging station needs to be implemented in detail in order to qualify as eligible. It might be necessary that the charging station in a company must be publicly accessible for a certain period of the day in order to be able to apply for funding. In most cases, proof of the purchase of electricity from renewable energies for the supply of the charging station is required.

How the implementation of the charging station can be reconciled with the respective funding conditions must be clarified in advance with an expert.

### ***3.10. Visualization and communication of charging options***

Guests who own an electric car decide while booking a holiday for an accommodation or a holiday destination, in which appropriate charging options are available. An appropriate communication of the charging station on site at various levels is therefore important in order to inform potential guests about the additional offer.

The communication can take place, for example, via the hotel's own homepage, via the homepage of the tourism association, via various web platforms with the option of registering charging stations, via print media, newsletters, etc.

Concerning web platforms, e.g. the following non-brand directories are recommended for registering the charging stations and informing e-car drivers:

- <https://www.goingelectric.de/stromtankstellen/>
- <https://e-tankstellen-finder.com/>
- <https://lemnet.org/de>
- <https://www.plugfinder.de/>
- <https://chargemap.com/>
- <http://www.greenmobility.bz.it/green-mobility/ladesaeulen/>

There are also other charging station directories, e.g. from the individual suppliers of charging stations. Charging stations can also be found in the navigation systems of e-vehicles.

All e-mobility activities should generally be integrated into local and regional (but also national) public relations. Furthermore, the activities should be included in the various tourism programs of the municipality and the region.

In order to further attract and expand the local e-mobility offer, it could be considered that special packages could be put together. For example, hotels could offer a package that includes not only accommodation and board, but also an "all-round carefree package" for the guest's electric car (uncomplicated vehicle charging, secure parking space in the hotel garage, free use of community mobility services during the charge of the e-cars, etc.).

For optimal communication and visualization of the charging stations, not only the advance information, but also the on-site information is important. The charging station should be easy to find and accordingly well signposted / marked. Especially at large car parks, it can be difficult to find the charging station and the associated parking spaces right away. A signage of the charging station is recommended, should it not be immediately locatable. Integration of the charging infrastructure into the local signposting system is recommended.

The marking of the charging facility also includes the designation of the corresponding parking spaces, which can be used by the electric vehicles during the charging process. A marking of the parking lots via ground marking as well as on a sign-board is recommended. Perhaps a stopping and parking prohibition, except for electric vehicles for the duration of the charging process is necessary in order to prevent other vehicles from being parked here and blocking the charging station.



Figure 6: Exemplary signage of a charging station with pictogram (Source: im-plan-tat); „Stromtankstelle“ means charging station

Even at the charging station itself, it is essential to provide the most important information for the user. The power output must be visible at the station. It must also be specified how exactly the billing can be carried out. Informations about the charged amount of electricity, the past charging time, the remaining charging time, etc. are also very helpful for the user. Lastly, emergency contact details should also be displayed on the charging station, which can be used in case of problems or questions.



### **3.11. Product recommendations**

In order to be able to recommend suitable products to tourist hosts in accordance with their requirements, a call for tenders was issued to various providers who were then given the opportunity to submit corresponding offers.

Twenty different providers were contacted within the call for tenders and the offers received were compared on the basis of the criteria previously specified in the call for tenders. As part of an analysis of the tenders received, the products of the suppliers listed below were rated best in terms of the requirements of the use of charging stations in tourist businesses.

The requirements within the call for tenders for the offered products were as follows:

- It was essential to ensure that the use of the charging infrastructure in tourist establishments (accommodations) can be done via the room bill of the respective guest. In this regard, the providers had to submit a corresponding proposal for implementation (description of the software solution, mentioning of the partner companies to be integrated with their own software solution).
- Equipping the charging infrastructure with a billing system via debit card, credit card or similar (system independence is required) should also be included in the offer.

Other requirements for the offered products:

- Description of the placement of the e-charging infrastructure
- Only charging stations with charging sockets are required (type 2 socket with emergency release), no attached cable
- Description of the technical characteristics of the charging station (circuit breaker, DC fault detection, etc., description of the necessary measures in building services)
- Integrated meter: display of the charged kWh
- Load management for parallel loads
- Technical maintenance of the system
- Annual operating costs of the system

The laws, standards and (electro-) technical regulations at the international level or the respective country must be strictly adhered to.

In the following (see next pages) the offered products of the three best tenderers will be presented shortly. For more detailed information on the products or to purchase the products, please contact the respective supplier directly, referring to the "Call of tender for e-charging infrastructure in Alpine Pearls accommodations" dated May 2018.

Exemplary product images can be found in the appendix.

The three best tenderers and the respective contact details:

#### **AAE-Hydro Solar GmbH**

9640 Kötschach 66, Austria  
tel: +43 (0)4715 222  
mail: [info@e-charging.at](mailto:info@e-charging.at)  
web: [www.e-charging.at](http://www.e-charging.at)

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### **innogy SE**

Opernplatz 1, 45128 Essen, Germany  
tel: +49 201 12-02  
mail: [contact@innogy.com](mailto:contact@innogy.com)  
web: [www.innogy.com](http://www.innogy.com)

### **ENIO GmbH**

Geyschlägergasse 14, 1150 Wien, Austria  
tel: +43 (0) 1 934 6681 – 0  
mail: [office@enio.at](mailto:office@enio.at)  
web: [www.enio-management.com](http://www.enio-management.com)

**At this point, it should be noted that, of course, the products of other manufacturers / providers may be suitable for tourist use as well. In order to coordinate with the respective provider, you are welcome to use the points mentioned in this checklist or the requirements described above regarding charging stations for use in the tourist sector.**

Anbieter (Firma) / Kriterium	Abrechnung über Zimmerrechnung des Gastes	Verrechnung über Bankomatkarte/Kreditkarte etc.	Platzierung der E-Ladeinfrastruktur (Parkplätze)	Ladestationen mit Ladebüchsen	technische Eigenschaften der Ladestation (Schutzschalter, Gleichstromfehlererkennung, etc.)	notwendige Maßnahmen Haustechnik	Integrierter Zähler	Lastmanagement	Wartungsaufwand	jährliche Betriebskosten
AAE-Hydro Solar GmbH	HomeBlockSystem (auch für Hotels gut geeignet) <u>Vorgang:</u> Kunde checkt ein, Rezeptionist(in) generiert einen Zugangscode (ist zeitlich begrenzt, Kunde kann Ladung über Website kontrollieren) oder gibt eine RFID Karte aus, der Kunde konsumiert und wird mit dem Preismodell das eingestellt ist berechnet, beim Auschecken kann der/die Rezeptionist(in) die Gesamtrechnung mit den einzelnen Ladungen direkt über das Lokale Webportal ausdrucken, eine Anbindung an die Software vom Hotel ist möglich wird aber je Aufwand verrechnet	Bezahlung mittels Bankomat-, Kredit- oder Debitkarte möglich (ohne Mitgliedschaft, Registrierung oder APPs)	keine Angaben zur Platzierung der Stromtankstellen, aber vermutlich eigene Stromtankstellen-Parkplätze vorgesehen, wo Gäste laden können; Parkplatzverwaltung als ergänzendes System optional (mit Autoerkennungssensoren, Kombination von Parkscheinautomaten mit Ladelösung) --> konkreter Einsatz/Nutzen bei touristischen Betrieben müsste geprüft werden	Ladestation (Säule) mit Typ 2 Anschluss (ohne angeschlagenes Kabel) erhältlich	Schutzklasse 1 (höchster Schutz, Schutzleiterklasse), integrierte Gleichstromerkennung	<u>Installationen Elektriker:</u> Installieren des Homeblock PCs, Installieren der Ladestationen, Lastverteilung ( FI und Automat) für Abgänge von Ladestationen, Verkabelung zu den Ladestationen, Netzwerk Verkabelung zu den Ladestationen, eventuell für Lastmanagement beim Hausanschluss Installationen eines Energiemessmoduls von AAE <u>Notwendige Vorkonfigurierung:</u> Anlegen der RFID Karten pro Zimmer, Preismodell einstellen, Anlegen der Ladestationen	inkl. geeichter Energiezähler	übergeordnetes Lastmanagement als optionale Erweiterung für Laderegelmagementsysteme LRM 16 und LRM 17; OCCP/Slave	optionale Fernwartung; keine Angaben zum Wartungsaufwand	keine detaillierten Angaben zu den Betriebskosten; laufende Kosten der E-Ladeinfrastruktur 5.- Euro im Monat für den Zahlungsdienstleister unabhängig von den Buchungen
innogy SE	Inklusivleistung des innogy eOperate (Gast steckt an, Buchung einer Servicepauschale auf den Hotelgast, Ladung an der Rezeption gestartet, Zahlung durch Hotelgast über die Hotelrechnung); Ladevorgänge online starten und überwachen von der Rezeption aus; Bedienung mehrerer Boxen über eine Oberfläche im WEB Portal;	Erfüllung durch Direct Payment, Inklusivleistung des Betriebs-systems innogy eOperate - Kreditkarten- und PayPal-Bezahlung via App	- Entscheidung liegt beim Betreiber - Die Ausstattung sämtlicher Stellplätze mit Ladeinfrastruktur wäre aktuell überdimensioniert - wir empfehlen daher die Errichtung von gesonderten Stellplätzen mit Ladeinfrastruktur	Erfüllung durch die Produkte innogy eBox smart (Wallbox) und innogy eStation smart (Ladesäule) - Typ 2 Anschlüsse ohne angeschlagenes Kabel	Fehlerstromschutzschalter Typ B (30mA für Wechselstromfehlerströme und 6mA für Gleichstromfehlerströme) und Leitungsschutzschalter separat in der Unterverteilung (nicht im Lieferumfang)	genaue Anführung der notwendigen vorbereitenden Maßnahmen im Angebot enthalten	Geladene Strommenge wird komfortabel in der App des Nutzers angezeigt - für Deutschland zusätzlich Eichrechtskonformität bescheinigt von der PTB	Erfüllung durch das Betriebssystem innogy eOperate, Dynamisches Lastmanagement je Standort	Grundsätzlich kein Wartungsbedarf des Systems notwendig; Wartungsbedarf lediglich bei den Schutzkomponenten(z.B. FI-Schalter) analog den Normen und Regelungen des jeweiligen Landes	15 EUR/Monat/Ladepunkt (innogy eOperate)
ENIO	Hotelbetreiber/Rezeptionist kann alle Ladungen mit Zeit und Energiemenge jederzeit, auch im laufenden Betrieb, einsehen und Ladungen entsprechend seiner Firmenpolitik freischalten, verrechnen oder ggf. einem bestimmten Zimmer über RFID Karten zuordnen	Abrechnung von Endkunden durch ENIO im Auftrag des Mandanten inkl. Rechnungslegung im System (keine Papierrechnung) und Abwicklung über Prepaid (Einzahlung des Kunden über ETSweb Portal in Form von Guthaben) oder Zahlung mit Kredit- bzw. Bankomatkarte	Ladungen können über RFID Karten einem bestimmten Zimmer zugeordnet werden; eigene Stromtankstellen-Parkplätze (keine Ladestelle pro Zimmer)	Wallboxen mit Typ 2 Anschluss ohne angeschlagenes Kabel	2 Typen an Wallboxen angeboten: Sicherheitseinrichtungen (FI Typ A und LS) sind bei einem enthalten und müssen beim anderen bauseits erfolgen; Wallbox mit Sicherheitseinrichtungen verfügt über Gleichstrom-Fehlererkennung	Anschlussleitungen sowie der elektrische Anschluss und die elektrische Inbetriebnahme durch einen konzessionierten Elektriker	Energiezähler inkludiert	optionales Lastmanagement; optionales Energiemanagementsystem; ENIO Ladestellenmanagement System ETSweb verwendet für den Einsatz im touristischen Bereich das sogenannte „Site Konzept für Managed Infrastructure“ (Ladestellen werden zentral verwaltet, Hotels müssen sich nicht um technische Details und Administration kümmern; Hotelbetreiber/Rezeptionist alle Ladungen mit Zeit und Energiemenge jederzeit, auch im laufenden Betrieb, einsehen und Ladungen entsprechend seiner Firmenpolitik freischalten, verrechnen oder ggf. einem bestimmten Zimmer über RFID Karten zuordnen)	Software-Wartung ENiBiz ist inkludiert; Hersteller-Garantie 24 Monate; keine detaillierten Aussagen zum Wartungsaufwand	Wallbox mit Sicherheitseinrichtungen ca. 3.000 EUR netto Anschaffung; ENIO-Site-Controller 2210 EUR netto (Anschluss einer NFC Einheit sowie Lastmanagement von Ladestellen zur Vermeidung von Überlast in großen Systemen (z.B. Begrenzung der Gesamtleistung zur Reduktion der Netzanschlussgebühr und Energiemanagement)); ETS eniBiz (Software): 5 EUR netto pro Monat pro Ladepunkt; ETS kom1 (Anbindung Ladestellen an ETSWeb): 7 EUR netto pro Monat pro Site; ETS bill (Abrechnung): 20% des Enkudenumsatzes; ETS enman (Energiemanagement Client): 0,85 EUR netto pro Monat und Ladepunkt

#### 4. E-bike charging stations

Of course, not only charging stations for e-cars are very important in tourism, but a well-developed charging infrastructure network for e-bikes is also extremely important. E-bikes open up new potential, especially in leisure traffic, and are already in high demand in many tourist communities. Especially for the Alpine region, they are an ideal and environmentally friendly means of transport to explore even routes with more ambitious altitude profiles without much effort. To further promote gentle cycling tourism, the presence of e-bike charging infrastructure is essential.

Also in this regard - as with the charging infrastructure for e-cars - various framework conditions must be considered in the course of implementation, in order to offer the e-bike riders an optimal charging experience.

The most popular destinations for e-bike charging stations are: tourist attractions, snack bars, restaurants, leisure facilities or sights. Also in accommodations, charging opportunities are often in demand. Uncomplicated and cost-effective loading should be guaranteed.

In addition to providing charging infrastructure for e-bikes, the implementation of secure bicycle parking facilities or storage facilities (such as lockers for removable batteries or luggage / helmets) is also a key element in the implementation of e-bike charging infrastructure.

It is often a concern of the cyclists to be able to park their e-bike in sight (eg. when a place is visited) or in the best case to be able to lock it safely together with the luggage (eg at the hotel or during a visit of a museum or as the case may be).

Batteries of e-bikes are usually charged via the normal domestic socket. Due to the lack of uniform standards regarding e-bike battery chargers, there is still a need to carry your own charger. The demand of the guests for a safe storage place for charger and battery during the charge is therefore large.

There is a distinction between batteries that can be removed from the bike and batteries that are permanently installed on the bike. Removable batteries may e.g. be taken into the house to charge it here at a socket via the charger. Non-mobile batteries, however, remain on the bike and must be connected via a charger directly to a socket.

If there are normal domestic sockets provided for charging (removable) batteries, e.g. in a restaurant, there may be problems with liability in the event of damage or theft, as the batteries and associated chargers can mostly not be monitored all the time of the charge.

Therefore it is recommended to implement professional charging options for e-bikes. In this context, co-operation between the municipality, the tourism association, neighboring tourist businesses, bicycle dealers or other institutions may be useful in order to offer guests a top-quality, comprehensive and suitable solution.

There are different solutions for parking or charging options for e-bikes, for example:

- Charging facilities at common bicycle parking facilities: Integration of charging infrastructure, e.g. on conventional bicycle racks (see, for example, Stromport's product: <http://stromport.com/>) with safe storage possibility for chargers. Also suitable for non-removable batteries. Or charging station with multiple slots per station, which can be installed at parking spaces. (For example, Bike Energy's product: <https://bike-energy.com/>, a

charging cable for popular e-bike brands can be borrowed from the curated charging stations or at the sports retailer)

- Locker system for recharging the batteries (and, if necessary, for locking luggage): If the battery can be removed from the bicycle, it can be locked in its own locker and charged via a standard socket. Lockers are usually available in the form of a loading cabinet (several lockers one above the other). There are different locking options (cylinder lock, code lock, etc.).
- Bike boxes with charging options: The e-bike can be locked together with luggage in its own bicycle box and at the same time the battery can be loaded in the box. The battery does not have to be removable, but can be connected directly in the box to the existing socket. The feeling of security is certainly greatest in this professional version and is the most comfortable option for e-cyclists, but is much more expensive compared to other options. Existing bike boxes can also be retrofitted with a charging infrastructure for e-bikes.

Also with regard to the purchase of e-bike charging infrastructure, there are often national or regional funding opportunities. The respective current funding actions and the individual funding conditions are to be examined prior to purchase.

E-bike charging stations must also be marked accordingly. Detailed information is important not only on site directly at the charging station (How does the charging process work, how much does the charging cost, how can I lock my charger?), but also a signposting / marking of the charging station may be necessary.

As with the charging stations for e-cars, the communication of the charging options is important. Online platforms / apps provide, for example, an optimal way to inform guests about the presence of e-bike charging infrastructure. There are often regional directories in which the charging station can be registered. Collaboration with the local tourism association regarding communication and advertising of the charging infrastructure is also helpful.

Exemplary apps / platforms for finding e-bike charging stations are:

- Fahrrad.de (for Austria, Germany and Switzerland)
- E-tankstellen-finder.com (e-car und e-bike charging stations; Austria, Germany, Switzerland, Italy, etc.)

## 5. Best Practice

### E-Grand Tour of Switzerland

The E-Grand Tour of Switzerland is the world's first official touring route, which can be traveled completely by an electric vehicle. To ensure this, a correspondingly well-developed charging infrastructure along the route is necessary. The total of about 300 charging stations along E-Grand Tour of Switzerland are positioned at a distance of max. 100 kilometers to each other and in max. five minutes distance away from the route (20 minutes for hotels). Thus, the 1.600-kilometer route, which leads over five alpine passes, through 51 cities and past 22 lakes and twelve UNESCO World Heritage Sites, can be comfortably passed by guests with their electric cars.

Motorways are usually avoided on the Grand Tour and are only used if reasonable in terms of traffic. This not only benefits the guests, who can enjoy the Swiss landscape and sights extensively, but also

the range of the electric vehicles, which can be significantly extended by slower and energy-saving driving. It takes about seven days to complete the entire route (with at least 5 hours of travel per day).

Depending on the local conditions, fast charging stations (at least 22kW) or normal charging stations (at least 11kW) were used along the route. In locations with short residence times (e.g., restaurants, attractions) and enough connected load, fast charging stations have been implemented. In places with a longer stay, such as hotels (overnight charging is possible here and lower power is sufficient), normal charging stations were implemented.

The charging stations usually have a smart access and billing system, making usage analysis possible. To be able to load at official E-Grand Tour charging stations, either payment by credit card or – if there is an existing membership with one of the partners - payment via RFID card or app is possible. Both the route itself, as well as the individual available charging options (or in particular the hotels with charging stations along the route) are marked accordingly locally or - for better advance planning - online on the website of Switzerland tourism.

The Grand Tour of Switzerland was launched in 2015 to help individual tourists plan and carry out their journey through Switzerland. Only in summer of 2016, 50.000 guests traveled along the route. The generated value of Grand Tour guests in the summer season 2016 was around CHF 25 to 31 million. Since April 2017, the implementation of a dense charging station network has made it possible to drive in an environmentally friendly way along the route. From 2021 on, the Grand Tour Switzerland is expected to attract around 200.000 guests a year and to generate a value added of around CHF 225 million. Due to this facts, the Grand Tour of Switzerland is one of the top 5 road trips in the world.

The E-Grand Tour charging infrastructure underwent a first test during the WAVE Trophy in June 2017 (the world's largest electric car rally), which brought the participating 140 electric vehicles along the route of the E-Grand Tour.

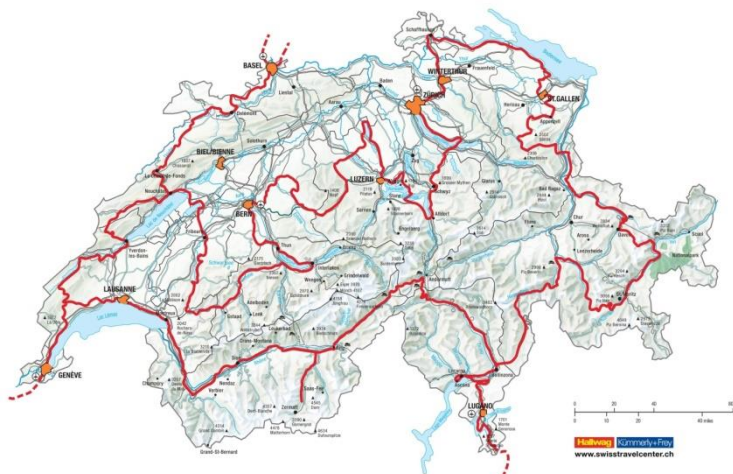


Figure 7: Route of the E-Grand Tour of Switzerland, Source: <https://www.swisstavolata.ch/aktionen/grand-tour-of-switzerland/>





Figure 8: E-Grand Tour charging station (wall box), Source: <https://www.presseportal.ch/de/pm/100059618/100803840>

#### Contact:

Switzerland Tourism: [info@myswitzerland.com](mailto:info@myswitzerland.com), 00800 100 200 29,  
<https://www.myswitzerland.com/de-at/e-grand-tour.html>

Alpiq E-Mobility AG: [e-mobility@alpiq.com](mailto:e-mobility@alpiq.com), +41 58 833 82 82, <http://www.alpiq-e-mobility.ch/de-ch/home.html>

#### **Comprehensive e-mobility offer of the Hotel Kaiserhof in Anif-Salzburg**

The Hotel Kaiserhof is located in Anif just outside the city of Salzburg in Austria. The owner of the hotel, Richard Absenger, has committed himself to environmentally friendly mobility and is a "klima aktiv mobil" project partner, a flagship company in the field of mobility, awarded by the Austrian Federal Ministry of Sustainability and Tourism. The Hotel Kaiserhof makes a significant contribution to the reduction of CO2 emissions through various measures in the area of mobility and at the same time offers its guests a comprehensive range of e-mobility services.

The Kaiserhof offers an unbelievable number of 26 charging options, located just two minutes by car from the motorway on the main road to Salzburg. The hotel has its own photovoltaic system with 67 KWp power and a connected battery storage, which can cover a significant part of the electricity needs of the hotel and which also helps to stabilize the power grid.

A part of the charging stations was installed under a carport and is therefore roofed, which makes the charging experience very comfortable. While staying at the hotel, guests can charge their electric vehicle at one of the standard charging stations (type 2, high voltage or household power socket) under the carport free of charge.

Furthermore, there are some fast charging stations in the hotel parking lot. A Tesla Supercharger offers Tesla electric vehicles at six charging stations the opportunity to recharge their batteries with up to 120kW of power. In addition, a so-called „triple-charger“ (one Type 2, one ChaDeMo and one CCS connection) of the provider SMATRICES is part of the charging infrastructure on site. Charging at the SMATRICES charging station with up to 100kW connection power is possible with existing SMATRICES membership.

The city of Salzburg is located about six kilometers away with numerous sights and cultural destinations. The guests of the hotel have the opportunity to leave their e-car at the hotel car park, load it here and at the same time go by bus to the city. A bus stop is conveniently located only 150 meters from the hotel, during the week the buses run about every half hour.

For guests who do not have their own electric car or want to try other models, the hotel offers its own e-cars for hire. The hotel's fleet includes, among others, a Tesla Model S and a Tesla Model X. In order to be able to experience e-mobility while on vacation, the hotel has created its own packages. These include, for example (package "Tesla E-Motion") two nights with half board at the Hotel Kaiserhof and a half-day trip with the Tesla Model S to a nearby automobile museum including training and accompaniment by the hotel-owner Richard Absenger. Another package ("Triple E") offers guests three nights at the hotel, board and every day another e-vehicle for testing. A good selection of different models (E-Smart, Renault Zoe and Tesla) offers electric driving pleasure during the entire stay, the own car can be left at the hotel or even a public arrival to the hotel is facilitated by the e-mobility offer on site. The packages guarantee a very special holiday of a different kind and offer the opportunity to familiarize yourself with electric mobility in a relaxed atmosphere.

The Kaiserhof has repeatedly represented Austria as part of eTour Europe. Most recently, the award ceremony for the large electric vehicle tour took place in June 2017 at the Hotel Kaiserhof. The Hotel Kaiserhof also took part in the tour with one of its electric cars, thereby acting as e-mobility ambassador in nine European capitals.



Figure 9: Hotel Kaiserhof with its own e-vehicles, source: <https://blog.autriche.com/2016/02/25/kaiserhof/>

**Contact:**

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+43-6246-8920, [office@kaiserhof-anif.at](mailto:office@kaiserhof-anif.at), <http://www.kaiserhof-anif.at/de/>



### **E-bike concept in the Wachau region**

The landscape in and around the valley of the Danube in central Lower Austria is called the „Wachau“ region. The Wachau as UENSCO World Heritage site offers a variety of tourist attractions and beautiful tours.

In order to be able to reach these places comfortably and environmentally friendly without owning a car, a tourist e-mobility offer was created in 2010. In the course of this, the project focused on the provision of e-charging stations for e-bikes and the development of an e-bike rental system. The Wachau World Heritage Site should thus be associated with the topic of electromobility and an additional mobility offer should be created for existing as well as for new target groups.

When implementing the e-charging stations, it was essential that the power supply could be ensured from 100% renewable energy. The charging possibilities were positioned, for example, in hotels, restaurants, sightseeing spots, parking lots or at tourist information offices. Therefore, a dense network of both public and operational e-charging stations could be provided for the guests.

At some selected points in the region - also at touristic companies and information offices - there was also implemented a rental service of e-bikes or Segways. The rented as well as own vehicles can be charged at the e-charging stations in the region for free. This can be done by means of an RFID card, which can be borrowed from the regional information offices as well as from tourist partners.

The tourism businesses of the Wachau region were intensively involved in the project as potential mobility partners. For example, an information evening and vehicle tests were offered to the companies, information was sent to the companies and communities in the region as well as personal acquisition on site was carried out. Afterwards, contracts were concluded with the mobility partners. Then the electric vehicles and charging stations were delivered to the partners and installed. There was a uniform pricing within the region for the e-mobility services. In addition to that, tourist packages were put together by the project participants involving the e-mobility offers.

Not only in the Wachau region itself, the project was able to generate great added value, but by using Austrian products (charging stations of the regional energy supplier, vehicles produced in Austria), national added value was achieved.



Figure 10: Source: <https://50plushotels.wordpress.com/tag/gartenhotel-weingut-pfeffel/>



Figure 11: Source: <https://50plushotels.wordpress.com/2012/10/08/mit-dem-e-bike-kam-die-revolution-fahrrader-erleben-ihre-renaissance-in-tausend-formen/>

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## 7. Appendix

## SHORT NOTE: E-CHARGING INFRASTRUCTURE IN TOURISM



photo: im-plan-tat

### **Why investing in charging infrastructure is already worthwhile for you today!**

- ✓ **new customer acquisition** (e-car drivers as a new customer segment)
- ✓ **increase in sales** (by wealthy e-mobile guests)
- ✓ **unique selling point** (increase in competitiveness through additional infrastructure)
- ✓ **sustainable and positive image** (positioning as a sustainable, innovative company)
- ✓ **currently good national/regional funding opportunities** for the purchase of charging infrastructure

### **Requirements for e-charging stations for tourist use**

- ✓ checking the **implementation in the building services**, in order to avoid high connection costs of the network operators
- ✓ good **placement of the charging stations** (shortest possible distance to the control cabinet, cable length / cable cross-section / protection decisive for max. power of the loading point)
- ✓ **common standard connection** (type 2 charging sockets), suitable for a large number of different electric vehicles, no attached cable
- ✓ **load management** for optimal shifting of load peaks
- ✓ necessary **safety equipment and technical requirements** (eg integrated meter)
- ✓ **paying for the charging processes** (provision of the infrastructure) **via the room bill / flat rate** (observe national legal framework conditions! Example: Austria: billing of the charging is only possible in the course of a "provision of infrastructure for charging", not directly consumed electricity)
- ✓ but also **barrier-free payment option with credit card / debit card** -> ensure public accessibility!
- ✓ good **labeling and communication** of the charging stations

### **Exemplary solutions of selected suppliers\***

- ✓ **ENIO**: guest receives **own RFID card** for loading (attributable to each room), **billing of end customers by ENIO** on behalf of the client incl. accounting in the system, processing **via prepaid or payment by credit card / debit card**, charging points are **managed centrally**, companies do not have to worry about technical details and administration
- ✓ **AAE**: generation of **access code** (is limited in time, customer can control charge via website) or issuing **RFID card**, total **invoice** with each charge directly **via the local web portal** printable (fully automatic billing), a **connection to the software from the hotel** is possible
- ✓ **INNOGY**: booking of a **service fee for charges** on the guest, **payment via hotel bill**, loading can be started and monitored online e.g. from the reception desk (operation of several charging stations via one interface in the WEB portal possible), **credit card and PayPal payment via App** possible

\* About twenty different providers were contacted in the call for tenders and the offers received were compared on the basis of the criteria previously specified in the call for tenders. As part of an analysis of the offers received, the products of the above-mentioned suppliers were best judged on the requirements of the use of charging stations in tourist businesses.

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