

# PIT STOP

Electric driving is clearly on the road to success. Thus, six months after our first charging network test, umlaut and connect now take a closer look at the charging infrastructure in the whole D/A/CH region.



Hakan Ekmen, CEO Telecommunication at umlaut

„By extending our charging network test to Switzerland and Austria, we accommodate the fact that electric driving also crosses borders. When looking at the results, we still find distinct differences in quality among the various providers, but also recognize improvements in comparison to our first test conducted in the spring.“

Suppose that electro mobility keeps on developing at the high pace which the car industry and politics strive for, the charging infrastructure will soon play an equally important role as the mobile communication networks already do. Therefore, after our launch in early summer we already ignited the next stage and conducted a charging network test not only covering Germany, but also Switzerland and Austria. As popular holiday destinations and classic transit countries, both Alp republics are also visited by many German electric car drivers – and vice versa. The e-mobility roaming provider Hsubject recently announced numbers indicating that 66 percent of charging activities in Austria and even 84 percent in Switzerland are processed via foreign electro mobility providers

(EMPs). In Germany, this number is only at 17 percent – meaning that 83 percent of charging processes are handled by national EMPs.

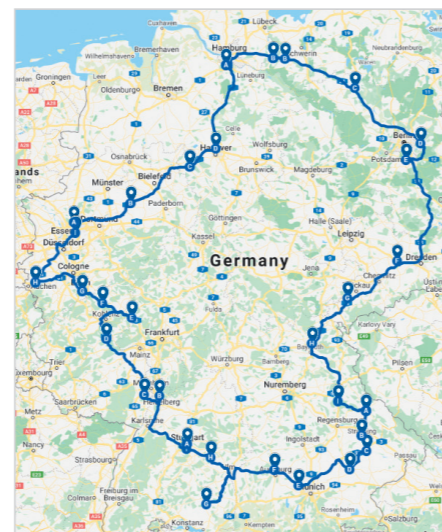
### Not everything is perfect yet

All the more important would be convenient and reliable charging operations, transparent information about pricing and fair roaming terms – avoiding billing shocks after foreign use which are only historic tales in mobile communications. The results of our charging network test at hand emphasize that there is still some work ahead in this respect of electric mobility.

As already practiced in our first test for Germany (see connect 7/2020), we again concentrate on the „High Power Charging“ (HPC) with a charging output of at least 150 kilowatts, which is relevant for

long-distance travelling. Read on the following pages, how the biggest EMPs and Charge Point Operators (CPOs) scored this time.

Hannes Rügheimer



**Test route Germany**  
umlaut test team for Germany conducted its test drives between September 21st and 25th, covering approximately 2800 kilometers.

## GERMANY

### Alpiq There were some hiccups in the transition of the former Telekom service to its new owner. The charging experience with Alpiq's app sadly continues this trend.

► In mid-2020 the Swiss-based provider Alpiq adopted Deutsche Telekom's EMP service Get-Charge. To the chagrin of the users, the transition was a little bumpy. However, all in all the company can be proud of its offering, even if by now it does no longer feature the widest coverage of charging points. Also, the app was not a source of much joy to the testers: In every-day use, it would react slowly and notchy, during testing there were some

crashes, and the testers had to re-login despite having stored the according credentials. The price information did also not work during our testing period – all charging operations were listed with 0 Euros in the history, but still normally billed later on. Another example for intransparency: there is a rate for "other charging stations" without any indication, for which stations it is applicable. All in all, we identified some room for improvement here.



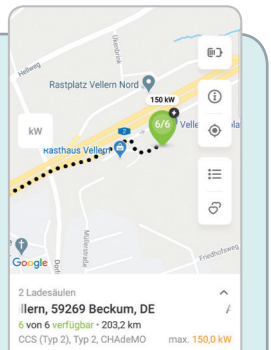
Sparse: The clean app design could offer more info.

**connect Verdict:** sufficient (571 P.)

### EnBW The full-range provider from Baden-Wuerttemberg offers a well laid-out app and transparent tariffs – and thus achieves a well deserved win in the EMP category.

► In addition to its role as a charging point operator (see page 90), the Baden-Wuerttemberg utility company is also active as a electro mobility provider covering various European countries. The charging cards offered by the German auto club ADAC also relies on the billing infrastructure of EnBW. Due to differences regarding roaming prices, the fast charging stations of lonity however can not be used with EnBW charging cards or the

"Mobility+" app for the time being. The initial registration in the app, which we had criticized as being edgy in summer, was considerably improved by EnBW since then. Operation and features are also convincing. The wish list now only contains an integration of charging stops into the route guidance. The pricing is clear and transparent, charging at the assessed stations worked without any noteworthy problems.



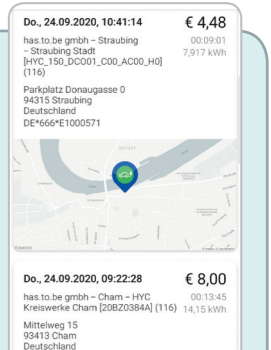
Pathbreaking: The app directs the way to the station.

**connect Verdict:** very good (851 Points)

### Maingau App and tariffs of the e-mobility brand "EinfachStromLaden" left only smaller things to be desired in our test. All in all a good result.

► With its brand "EinfachStromLaden" (Simply Charge Electricity), the energy provider located near Offenbach/Main turned out to be an important player among the electro mobility providers. With its charging tariffs and its app, the company supports an impressive number of charging point in the assessed countries. The app also offers a navigation guidance feature based on the online map service Mapbox – it is however not able to integrate

charging stops into the route guidance. Apart from that, using the app worked mostly flawless –from the initial registration up to charging. The only annoyance during our tests: Stations with a high wattage would appear as "0 kW" in the list. In its charging rates, Maingau differentiates between own customers and other users. At lonity stations, a higher price applies. And abroad, there are roaming surcharges. But the app tells all of this transparently.



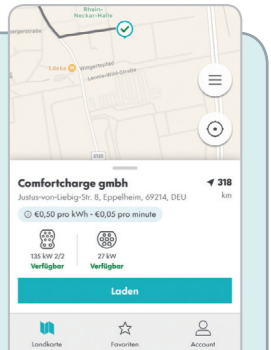
Transparent: The app does not hide the charging costs.

**connect Verdict:** good (794 Points)

### Shell Under the brand "Shell Recharge", the oil company braces itself for the future of e-mobility. In our test it offers a convincing overall solution.

► The formerly independent charging card provider NewMotion belongs to Shell since 2017. Meanwhile, also RFID cards, app and web appearance have been adapted to the brand "Shell Recharge". As an EMPS, Shell supports a wide selection of charging points in Germany and the neighbouring countries. Regarding the app and the background processes, the company benefits from the purchased experience of NewMotion: Registration is easy, finding

charging points works well. However, some of the stations can only be used with an RFID card and not via the app. We would also cherish some improvements in details such as a charging tutorial or route guidance integrating charging stops. The rates billed by Shell are different depending on the charge point operator (CPO), but are transparently communicated in the app. Unusual: Payment via credit card is not supported.



Informative: The app gives much info about charging.

**connect Verdict:** good (776 Points)

**Allego** The locations visited by our test teams essentially offered no cause for complaints. We still see some potential for small improvements.

► The operator Allego, based in the Netherlands, builds up a charging network with numerous stations in the Netherlands, Belgium and Germany. In Germany, currently 90 high power charging stations belong to it. For ad hoc charging, driver need Allego's own app "Smooov", in addition apps and charging cards from other EMPs are also supported.

Signage and weather protection at the stations visited by the testers leave something to be desi-

red. The locations themselves consisted of a fair-ground parking lot, a commuter car park, an industrial area, a garden center and an off-motorway service area – our requirements such as a restroom and dining venue were fulfilled in practically all cases. As Allego uses charging stations from different vendors, the operation and charging procedures were slightly different. However, there did not occur any problems in terms of identification and charging.



Fluctuating: Allego uses different types of charging stations.

**connect** Verdict: **satisfactory (743 P.)**

**Comfortcharge** When two out of five stations are disrupted, this may be bad luck – but it still raises a little scepticism.

► After handing over its EMP business to Alpiq (see page 89), Deutsche Telekom remains active in the e-mobility market as an operator of various charging points. In doing so, the company follows a somewhat different strategy than many other CPOs: Stations from Comfortcharge can often be found in residential or industrial areas. Some of them were also met by the testers a little hidden in an inner courtyard – in this case at least designated by a

sign at the gateway. During the test period, we unfortunately encountered more than one technical problems: In one case, even a reset of the station initiated by the hotline did not help – in another, the hotliner could not even remotely reach the station. In addition, during our test tours the generally supported ad hoc charging via QR code did not work. In the remaining cases, charging did work without any additional problems – but trust remains a little shaken.



Pretty in pink: The magenta-coloured stations are eye-catchers.

**connect** Verdict: **satisfactory (677 P.)**

**EnBW** Regarding the number of HPC points, the Baden-Wuerttemberg utility company is number two behind Ionity. The charging experience is also something to be proud of.

► Particularly in its own federal state, the Baden-Wuerttemberg-based energy provider operates a dense and growing network of charging stations – including the proud number of 322 HPC fast chargers (with a wattage of at least 150 kW). The stations visited by the testers could offer a somewhat better signage and part of them could use better illumination. A weather protection was missed in all cases. But all in all, the EnBW stations turned out to

be very reliable. At some stations, the user guidance could be a little more intuitive and informative – but this is complaining at quite a high level. All in all, the tested EnBW charging points belong to the upper class – with a small gap behind Ionity. Price communication and service were also convincing. Our wish list contains more payment options and depending on the location a little more convenience in their immediate surroundings.



Rock-solid: EnBW's stations were always reliable.

**connect** Verdict: **good (794 Points)**

**Our test cars** We thank Porsche and Sixt for lending us these electric cars.



**Porsche Taycan 4S**

We learned to appreciate the Porsche among the electric cars already in our first charging network test. With 390 kW/530 PS and 640 Nm, it definitely leaves nothing to be desired.



**Audi e-tron 55**

The e-tron 55 quattro in the Sportback version was kindly provided to us by the car rental company Sixt. Its 300 kW/408 PS also offer a lot of driving pleasure.

**EON** The Essen-based utility company offers a large charging network. But in our test, even two of the visited stations were not functioning.

► With the acquisition of Innogy in March 2020, the Essen-based energy provider also took over their charging network. In the meanwhile, the network also counts 119 high power charging points. In addition, the company also offers charging solutions for private and enterprise customers. When it comes to public charging, the operator supports its own charging card and its app "EON Drive" as well as various EMPs. At the EON Campus in Essen, charging is even free.

However, in our test, even two locations received negative attention by just not working. At one autobahn service station, the charging columns were completely dead. At an off-motorway service station, at least two out of four charging points seemed to be operational, but then did not support any charging. The hotline was also not able to help in these cases. At the remaining stations, we found some flaws regarding signage and weather protection, but at least the charging worked.



Outage: At two locations, charging was not possible.

**connect** Verdict: **satisfactory (716 P.)**

**E-Wald** The results of the Bavarian operator are mixed. The testers saw some need for improvement, but thanks to a committed garden center also a bright spot.

► The company located in Teisnach, near the Bavarian city of Deggendorf is engaged from car sharing up to operating a charging network and thus also counts a respectable number of stations. Part of them are a little hidden, and they scarcely shine with signage or weather protection. E-Wald often uses the same charging station type as EnBW – but while the Swabians have improved the user guidance, E-Wald uses the original version which

first receives the user with a dark display and waits for recognizing a charging card. So there is some opportunity for improvement in the details. However, a particularly positive charging experience was offered by the garden market Bogama in Boppard, Rhineland-Palatinate. Its owner Ingo Schwanenberger did not only establish the charging station by his own conviction, but also upgraded it with a solar roof, illumination and a feedback letter box.



Bright spot: Charging station at the Bogama garden market.

**connect** Verdict: **satisfactory (696 P.)**

**Fastned** With green electricity, friendly locations and a competent hotline, the Dutch operator provides a convincing performance.

► The Dutch company has the objective to build a network of 1000 fast charging stations all over Europe, which completely runs on renewable energy. At the time of testing, out of these, 42 high power charging stations were available in Germany. Usually, the Fastned stations shine with a friendly illumination and a roofing. Only in terms of signage, Fastned might still put it up a notch. Charging requires Fastned's own app, which however offers

a well designed and flawless charging experience. If the driver approaches a Fastned station and starts the app, it immediately offers all available charging points there. Above that, the app and the stations provide a multitude of interesting information about the car and the charging process. Much kudos are also deserved by the hotline, which was even able to address particular characteristics of the electric car used for testing.



Friendly: Fastned's stations are usually very pleasant.

**connect** Verdict: **good (769 Points)**

**Ionity** The joint project of various well-know car manufacturers, competently brings in the overall victory – as already in our previous test which we performed in summer.

► BMW, Ford, Hyundai, Mercedes-Benz and Volkswagen including its brands Audi and Porsche are the founders of Ionity. Together they want to establish a pan-european network of high power charging stations. When completed, the distance between any two stations is planned to never extend 120 kilometers. Between our test drives in April

and September, the number of charging points in Germany has already grown from 330 to 378. Even if we see some potential for improvement regarding signage, weather protection and payment options, the assessed German Ionity charging stations offer an absolutely convincing charging experience and a high degree of reliability already today.



High End: You know what you get at Ionity stations.

**connect** Verdict: **very good (855 Points)**

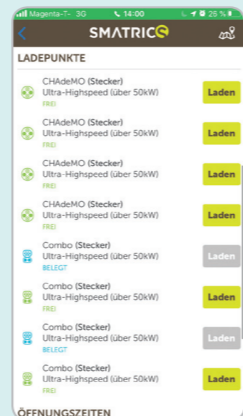
EMP

**Smaticrics** The Vienna-based all-rounder for e-mobility offers a full-fledged portfolio including charge cards, tariffs and an app. Some criticism concerns details.

► As we had to exclude the candidate Wien Energie from our assessment (see below), in Austria Smaticrics is the only electro mobility provider competing in this test. The company presents itself as a full liner for e-mobility – spanning the access to an Austria-wide charging network and its equivalents in the neighbouring countries up to charging at home. According to Smaticrics, with their customer cards or apps, charging points with a wattage of at least 43 kW can be found approximately each 60 kilometers along the Autobahns as well as in metropolitan areas.

Thus after the hassle-free registration in the Smaticrics app, the testers found a sufficient number

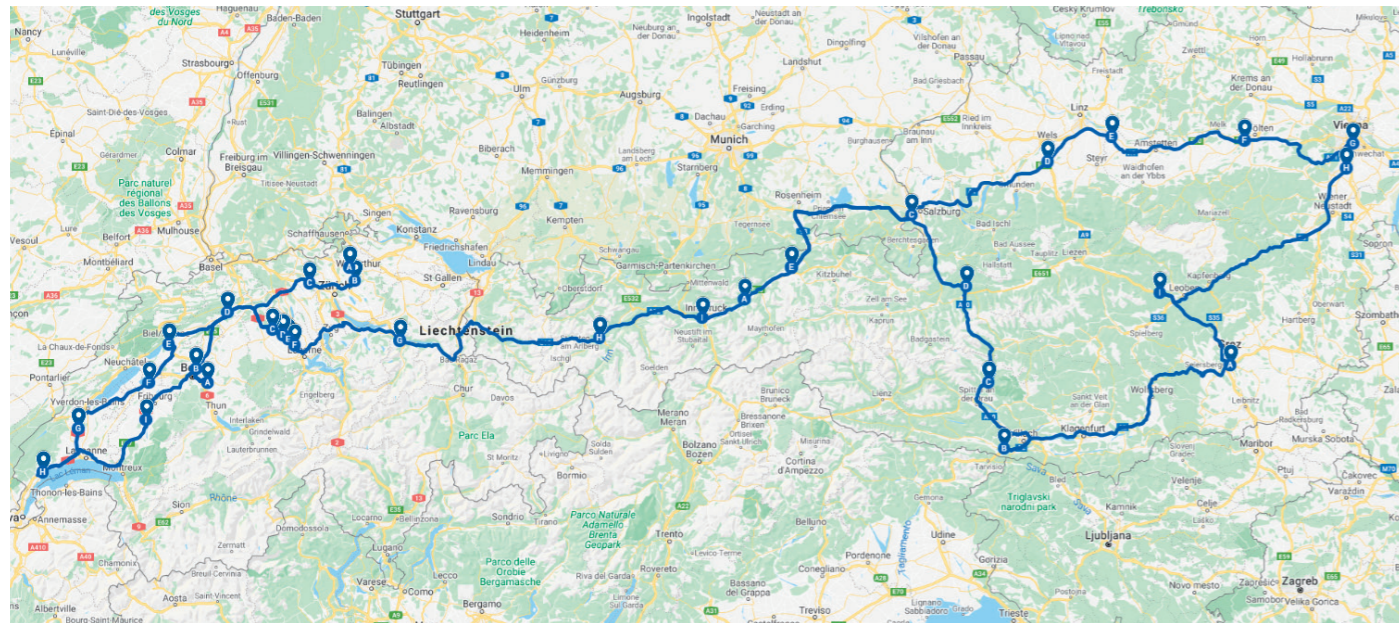
of locations where they could use it for charging. But if there are more charging columns with the same wattage present, the selection can become a game of luck, as the numbering of the stations is not always clear. Furthermore, it happened that a charge point was reported as busy although it was not occupied and also did not report any errors. Apart from these hurdles, the charging operation however worked without any additional flaws. The testers liked the filtering by wattage and/or plug type as well as the tutorial for different station types provided in the app. The billing plans are clear and transparently presented in the app. However, payments are only supported via credit card.



**Filter-tip:** Selecting stations by wattage or plug type works well.

**connect Verdict:** satisfactory (701 P.)

**Test route Austria / Switzerland** The testers made one continuous tour through both alpine countries.



■ umlaut's testing team conducted the test drives through Switzerland and Austria as one back-to-back tour. From October 2nd until October 6th the testers travelled in Switzerland, crossed the border to Austria on October 6th and continued testing there until October 9th. Subsequently, they drove home during the test drives in both alpine countries summed up to approx. 2500 kilometers.

In order to ensure the safety of the testers, we continuously adapted the tour planning, in order to avoid overnight stays and meal breaks in regions which were designated as

areas with a high Corona risk. Following their practical tests at the charging stations, they filled out their questionnaires while staying in the car.

We would have gladly assessed additional EMPs in both countries. To do, we had planned to include Wien Energie (Vienna Energy) in Austria as well as GreenMotion / EVpass in Switzerland. Unfortunately, both companies persistently refused to disclose the exact number of charging points supported by them – broken down by HPC, DC and AC charging points. While we only publish these numbers for information

purposes with the CPOs, they are a crucial part of our scoring of EMPs in the "Charge Point Coverage" category. In order to do so, we need the support of the providers, who had to prove the communicated numbers with listings of the counted locations or other suitable evidence. As Wien Energie and GreenMotion / EVpass did not want to disclose any such material, we had to exclude both companies from our assessment. We hope that in the future, EMPs scheduled for testing will bring themselves to offer more transparency and provide the necessary details for our assessment and for publication.



**Eye-catcher:** The orange-coloured stations stand out.

**Da emobil** The operator who mainly focuses on western Austria does many things right. A little more information about the charging would be welcome.

► Da emobil was founded in fall 2017 as a subsidiary of the two Tyrolean companies Fiegl + Spielberger and Goodmann. Both specialists for electrical engineering and energy delivery want to advance electro mobility as a full line supplier. Their focus in on western Austria, however they strive for a penetration of the whole alpine republic. At the time of testing, their charging network already comprised 7 high power charging points as well as 41 DC and

58 AC charging points. The orange-coloured fast chargers are particularly eye-catching. At some locations, they even offer charging opportunities for e-bikes. The locations range from Autobahn service areas to a public charging spot in front of a car dealership. The charging operation can be conveniently started via app, ad-hoc charging requires Da emobil's own app. Unfortunately, the stations do not offer any description of the necessary steps.

**connect Verdict:** good (828 Points)

**Ionity** The winner from Germany is also ahead in Austria – but here only narrowly ahead of the competition and with small trade-offs compared to Germany.

► The pan-european joint project of well-renowned car manufacturers (also see page 91) is also present in Austria. Although Ionity generally limits itself to offering HPC stations, in Austria the operator combines them with DC and AC charging points due to legal requirements. Thus, Ionity overall operates 60 HPC, 12 DC and 6 AC charging points in the alpine republic. Although the hardware obviously comes from another supplier than in Germany, the charging

experience is on a similarly high level than in the large northern neighbour-country. However, the stations are a little scant on information about the wattage and other charging details – this costs a few valuable points in comparison to the very good result in Germany. Still, the other aspects such as payment options or service are fine here as well, making Ionity the test winner in Austria by a narrow margin ahead of Da emobil.



**Own path:** In Austria, Ionity uses different stations.

**connect Verdict:** good (830 Points)

**Kelag** With their self-operated charging stations, the Carinthian energy company achieves an overall good results – still, we have some criticism about detail.

► The Kelag corporation is one of the leading energy providers in Austria, covering the business areas electricity, gas and thermal energy. The focus of its activities is in the federal state of Carinthia. The company supports e-mobility by providing an Austria-wide charging network, which at the time of testing comprised 4 HPC, 46 DC and 196 AC charging points. For charging, the company offers its own app as well as particular car charging electricity

tariffs. In addition, it also supports various EMPs. The signage of the charging spots could be better. Also, the tested stations could not score by offering illumination, weather protection or charging instructions. Furthermore, in direct sunlight the stations' displays are hard to read. But this is about all we have to criticize – charging worked flawlessly in our tests, and also the stations' surroundings were appealing.



**All fine:** We had only minor criticism about Kelag.

**connect Verdict:** good (793 Points)

**Smaticrics** The charging points were not totally convincing in our test. In one case, a wrong numbering cost one and a half hours of speaking with the hotline.

► As EnBW in Germany, Smaticrics plays a double role in Austria: In addition to its activities as an EMP, the company also operates its own network of charging stations – including 84 high power charging points, even outpacing Ionity in Austria. However, the practical charging experience in our tests left some room for improvements: At one location, the stickers

with the QR code and the numbers of the charging points were incorrectly placed. This was obviously not noticed during approximately one year of operation – the hotline assumed the problem in the car or its driver. Also, signage, weather protection, location surroundings and the amount of info presented in the display shows some potential for improvements.



**Still potential:** The testers saw some room for improvements.

**connect Verdict:** satisfactory (657 P.)

CPO

CPO

CAR CONNECT

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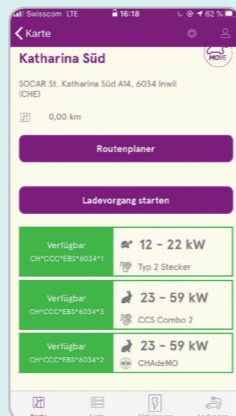
EMP

**Move** The joint company of big Swiss energy providers is a good choice for Swiss electric car drivers in order to identify themselves and pay at charging points.

► Move Mobility AG is a joint company of the Swiss energy providers Alpiq, ewb, Groupe E and Primeo Energie. It presents itself as a comprehensive e-mobility provider, offering its customers to use charging points of various CPOs in addition to those operated by Groupe E and Primeo Energie (see below). This adds up to a quite impressive coverage of charging points all over Switzerland. Identifying oneself at the stations is done with a key fob or via an app. For billing, the company offers various tariffs according to the needs of the drivers: With or without subscription, for charging at a fixed price or differentiated by the kind of purchased electricity (AC or DC) and the charging speed –

meaning: the wattage. These rates are transparently explained on Move's homepage, a product choice calculator assists in making the decision.

The app appears a little more scarce in presenting all of this information. Still, it is a good feature that the different wattages of the charging stations can be quickly recognized by a colour-coding. Filtering by plug types is also possible. Above all that, the testers would appreciate some kind of assistance in the app, and also an integration of the charging stops into the route guidance would be a welcome feature – which is however currently not supported by any of the tested EMPs. Payment is possible via credit card or SEPA direct debit.



At a glance: The information in the app is well laid out.

connect Verdict: good (777 Points)

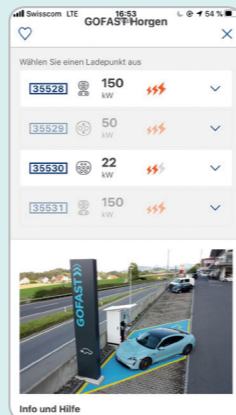
EMP

**Swisscharge** The St. Gallen based Swisscharge AG also makes a good impression in its role of an electro mobility provider.

► Swisscharge AG, located in Gossau in the St. Gallen canton, is a classic electro mobility provider, offering its services both to Charge Point Operators as well as to enterprises and public authorities – and also providing billing option for charging to drivers of electric cars via app or an RFID card. Various CPOs such as our candidates Agrola, GoFast und SOCAR (see right-hand page) use the platform of Swisscharge, but are also available via other EMPs. The number of supported charging points in Switzerland and the neighbouring countries runs into thousands – albeit about in the same magnitude as for the competitor Move. The business model however leads to different

charging costs depending on the CPO. They are transparently displayed on the website, but due to different bases of calculation (charging duration, wattage, both, with or without starting fees), they are sometimes hard to compare.

The initial registration in the app works intuitively, charging can then be started by just swiping in the app. In doing so, the app transparently reports the applicable billing model. Additional strong points of the app is the overviews of all charging costs within a month, which even graphically presents the costs or the amount of energy. We however missed a tutorial function and route guidance respecting charge stops.



Intuitively: Operating the app leaves no questions.

connect Verdict: good (773 Points)

CPO

**Move** The two CPOs Groupe E and Primeo Energie put their affiliation with Move in the first place – which is why we gave both of them a common score.

► The charging points belonging to the Move network are so distinctly branded that the user only realized at second glance that they are operated by the CPOs Groupe E and Primeo Energie. Therefore, we have decided to combine them under the brand Move in our assessment. The basis for this are three charging locations operated by Groupe E and two by Primeo Energie. We found some potential for improvements in the signage of the stations,

particularly on motorways as well as generally regarding illumination and weather protection. At some stations, the charging cable were so short that the charging socket placed on the left-hand side of the car could only be reached when parking between the marked parking spots. Operation of the stations and charging however worked without any problems. And both CPOs also offered a convincing performance in terms of service.



Short leash: In some cases, longer cables would be good.

connect Verdict: good (763 Points)



Easy to find: Ionity's signage in Switzerland is top.

**Ionity** Although we have some smaller points to criticize, the pan-european fast charging network of well-known car makers offers the best charging experience also in Switzerland.

► With 44 HPC charging points, the joint company of leading car manufacturers is already quite well established also in Switzerland – although particularly the local charging network Swisscharge can exhibit a higher number in this respect. Still, for Ionity customers from other nations, it is very convenient to be able to use their charging card or apps also in Switzerland and can expect a mostly familiar charging experience. As the company uses

different charging stations as in Germany, there is however no detailed explanation of the charging process familiar from German locations – much the same as in Austria. Moreover, at some locations there was no restroom available all around the clock. Liable to costs are these kinds of visits in any case. Despite these small limitations, Ionity is overall ahead in terms of charging convenience in Switzerland as well.

connect Verdict: good (812 Points)

CPO

**SWISSCHARGE**

**Agrola** The gas station group also offers charging stations and participates in the Swisscharge network. There is some room for improvements regarding stations and experience.

► Agrola is a Swiss energy provider based in Winterthur. In addition to petrol, diesel and fuel oil, the corporation also offers charging stations which can be found at the gas stations of the same name. During their opening hours, these locations offer at least restrooms and – with the usual limitations – also restaurants and shopping. Apart from the EMP app if the Swisscharge network, Agrola customers can also use Agrola's own

e-mobility app. It might be worth installing it as this app promises reserving charging spots – other than the Swisscharge app. In order to actually find the stations, in addition to the location information in the app, a better signposting would be desirable. During the charging, the stations also are a little scarce in supplying information about the process. However, the hotline made a very good impression.



Close-lipped: The stations could be more informative.

connect Verdict: satisfactory (709 P.)

CPO

**GoFast** The Zurich-based company wants to advance building a Swiss fast charging network along with partners. The charging experience is overall good.

► Together with local and national partners, the Zurich-based company concentrates on building and running a fast charging networking spanning all over Switzerland. Many of the HPC points available in the Swisscharge group are operated by GoFast. Above that, according to the company all GoFast charging points are operated with 100 per cent renewable energy. However, at different locations also different tariffs can apply – which are presented

in the Swisscharge App or to ad hoc users also in the display of the station. The signage if the locations could be better – still, the typically blue charging stations are easily detectable even from some distance. Weather protection is partially present, but only protects the hardware, not the user. But all in all, the charging experience is good. A nice detail at the Oensingen station: During charging, the car vacuum cleaner can be freely used.



Clear focus: The roof protects the station, not the driver.

connect Verdict: good (790 Points)

CPO

**SOCAR** The oil company also builds fast charging stations along Swiss motorways and provides them to the Swisscharge network. The charging experience is okay.

► The State Oil Company of the Azerbaijan Republic, short SOCAR, is based in Baku, Azerbaijan. Its Swiss branch not only operates gas stations, but also charging stations with a clear focus on fast charging or high power charging points respectively. The company provides about 20 such stations along Swiss motorways to the Swisscharge network. Payment can be done via Swisscharge, with SOCAR's own charging card

E-Tenso, via credit card or after sending a SMS text message also via the cellular bill. The signposting at the locations is good, and also 24h available restrooms were present at the tested locations – however no restaurants or shops. The stations would not reveal the current wattage, but other charging information is provided. All in all, the charging experience was okay, the friendly hotline was very convincing.



First things first: SOCAR's stations worked flawlessly.

connect Verdict: satisfactory (725 P.)

CPO

Provider	Ionity	EnBW	Fastned	Allego	EON	E-Wald	Comfortcharge
<b>Web</b>	ionity.eu/de	www.enbw.com/elektromobilitaet	fastnedcharging.com/de	www.allego.eu/de-de	www.eon.de/de/pk/e-mobility.html	e-wald.eu	www.comfortcharge.de
Number of supported charging points HPC (min. 150 kW) / DC / AC	378 / - / -	322 / 830 / 1957	42 / 42 / 17	90 / 611 / 1428	119 / 437 / 1970	40 / 174 / 570	105 / 183 / 216
<b>Locations and Surroundings</b>							
Signage / Illumination / Roofing	insuff. / v. good / insuff.	insuff. / suff. / insuff.	insuff. / v. good / satisf.	insuff. / v. good / insuff.	insuff. / suff. / insuff.	insuff. / suff. / insuff.	insuff. / good / insuff.
Restroom / Restaurant / Shop, Kiosk nearby	v. good / v. good / v. good	good / good / satisf.	satisf. / v. good / suff.	good / good / satisf.	satisf. / good / satisf.	suff. / satisf. / insuff.	suff. / good / insuff.
<b>Charging Stations</b>							
Operation / Placement / Display	v. good / v. good / v. good	v. good / v. good / v. good	v. good / v. good / v. good	v. good / v. good / good	v. good / good / v. good	satisf. / v. good / v. good	v. good / v. good / v. good
Info Wattage / Functionality / Scope of Information	v. good / v. good / v. good	v. good / v. good / v. good	good / v. good / v. good	v. good / v. good / good	v. good / suff. / v. good	v. good / v. good / good	insuff. / suff. / suff.
Signage / Parking spot designation / Size	good / insuff. / v. good	insuff. / good / v. good	v. good / v. good / v. good	v. good / insuff. / v. good	insuff. / insuff. / v. good	suff. / satisf. / satisf.	v. good / good / v. good
<b>Service/Hotline</b>							
Hotline phone number visible at station / Costs	very good / very good	very good / very good	very good / very good	very good / very good	very good / very good	very good / very good	very good / very good
Multilingual / Availability / Access to errors	v. good / v. good / v. good	satisf. / v. good / v. good	satisf. / v. good / v. good	v. good / v. good / v. good	satisf. / v. good / insuff.	satisf. / v. good / suff.	satisf. / v. good / insuff.
<b>Payment</b>							
Support for ad-hoc charging / Price info. on station or web	very good / very good	very good / very good	sufficient / very good	sufficient / very good	very good / very good	very good / very good	good / very good
Credit card / Giro Pay / Apple Pay / Google Pay / PayPal	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+
<b>Test results</b>							
Points Locations/Surroundings (max.250)	satisfactory (176)	sufficient (143)	sufficient (143)	sufficient (163)	sufficient (143)	adequate (81)	insufficient (98)
Points Charging Stations (max.350)	very good (309)	very good (326)	very good (326)	very good (299)	good (274)	good (270)	good (292)
Points Service (max.150)	outstanding (150)	outstanding (145)	outstanding (145)	outstanding (150)	good (119)	good (125)	good (117)
Points Payment/Price transparency (max.250)	very good (220)	satisfactory (180)	sufficient (155)	sufficient (131)	satisfactory (180)	very good (220)	satisfactory (170)
<b>connect</b> VERDICT max. 1000	855 very good	794 good	769 good	743 satisfactory	716 satisfactory	696 satisfactory	677 satisfactory



Provider	Ionity	Da emobil	Kelag	Smatrics
<b>Web</b>	ionity.eu/de	www.da-emobil.com	www.kelag.at/energiwelt	smatrics.com
Number of supported charge points (min. 150 kW) / DC / AC	60 / 12 / 6	7 / 41 / 58	4 / 46 / 196	84 / 343 / 585
<b>Locations and Surroundings</b>				
Signage / Illumination / Roofing	suff. / v. good / insuff.	insuff. / v. good / insuff.	satisf. / insuff. / insuff.	insuff. / v. good / insuff.
Restroom / Restaurant / Shop, Kiosk nearby	v. good / v. good / v. good	v. good / good / v. good	v. good / v. good / v. good	suff. / suff. / suff.
<b>Charging Stations</b>				
Operation / Placement / Display	good / good / v. good	suff. / v. good / v. good	suff. / v. good / v. good	satisf. / suff. / v. good
Info Wattage / Functionality / Scope of Information	insuff. / satisf. / satisf.	v. good / v. good / v. good	v. good / satisf. / v. good	v. good / satisf. / satisf.
Signage / Parking spot designation / Size	v. good / v. good / v. good	v. good / v. good / v. good	v. good / v. good / v. good	v. good / v. good / v. good
<b>Service/Hotline</b>				
Hotline phone number visible at station / Costs	very good / very good	very good / very good	very good / very good	very good / very good
Multilingual / Availability / Access to errors	good / v. good / v. good	good / v. good / v. good	good / v. good / suff.	good / v. good / insuff.
<b>Payment</b>				
Support for ad-hoc charging / Price info. on station or web	very good / very good	very good / very good	very good / very good	suff. / suff.
Credit card / Giro Pay / Apple Pay / Google Pay / PayPal	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+
<b>Test results</b>				
Points Locations/Surroundings (max.250)	satisfactory (185)	sufficient (144)	sufficient (138)	sufficient (153)
Points Charging Stations (max.350)	good (278)	very good (316)	good (298)	good (277)
Points Service (max.150)	outstanding (147)	outstanding (148)	very good (137)	satisfactory (112)
Points Payment/Price transparency (max.250)	very good (220)	very good (220)	very good (220)	insufficient (115)
<b>connect</b> VERDICT max. 1000	830 good	828 good	793 good	657 satisfactory



Provider	Ionity	GoFast	Move	SOCAR	Agrola
<b>Web</b>	ionity.eu/de	www.gofast.swiss	www.groupe-e.ch/de	www.socarenergy.ch/de-ch	www.agrola.ch/de
Number of supported charge points (min. 150 kW) / DC / AC	44 / - / -	89 / 266 / 683 (Swisscharge)	37 / 155 / 596	89 / 266 / 683 (Swisscharge)	89 / 266 / 683 (Swisscharge)
<b>Locations and Surroundings</b>					
Signage / Illumination / Roofing	v. good / satisf. / insuff.	insuff. / insuff. / insuff.	suff. / insuff. / insuff.	v. good / insuff. / insuff.	insuff. / v. good / v. good
Restroom / Restaurant / Shop, Kiosk nearby	satisf. / v. good / suff.	satisf. / suff. / suff.	v. good / suff. / suff.	v. good / insuff. / insuff.	satisf. / suff. / suff.
<b>Charging Stations</b>					
Operation / Placement / Display	good / satisf. / v. good	v. good / v. good / v. good	v. good / good / v. good	v. good / v. good / v. good	satisf. / v. good / v. good
Info Wattage / Functionality / Scope of Information	insuff. / satisf. / satisf.	v. good / v. good / satisf.	good / v. good / satisf.	insuff. / suff. / v. good	insuff. / satisf. / satisf.
Signage / Parking spot designation / Size	v. good / v. good / v. good	v. good / v. good / v. good	v. good / v. good / v. good	v. good / s.good / v. good	v. good / s.good / v. good
<b>Service/Hotline</b>					
Hotline phone number visible at station / Costs	very good / very good	very good / very good	very good / very good	very good / very good	very good / very good
Multilingual / Availability / Access to errors	good / v. good / v. good	good / v. good / v. good	good / v. good / v. good	good / v. good / suff.	good / v. good / satisf.
<b>Payment</b>					
Support for ad-hoc charging / Price info. on station or web	very good / very good	very good / very good	very good / very good	very good / very good	very good / very good
Credit card / Giro Pay / Apple Pay / Google Pay / PayPal	+/+//+//+	+/+//+//+	+/+//+//+	+/+//+//+ + cellular	+/+//+//+
<b>Test results</b>					
Points Locations/Surroundings (max.250)	satisfactory (174)	sufficient (131)	sufficient (126)	insufficient (102)	insufficient (109)
Points Charging Stations (max.350)	good (271)	very good (332)	very good (311)	very good (313)	good (283)
Points Service (max.150)	outstanding (147)	outstanding (147)	outstanding (146)	very good (130)	very good (137)
Points Payment/Price transparency (max.250)	very good (220)	satisfactory (180)	satisfactory (180)	satisfactory (180)	satisfactory (180)
<b>connect</b> VERDICT max. 1000	812 good	790 good	763 good	725 satisfactory	709 satisfactory



Errors and omissions excepted \* Apple Pay and Google Pay only at stations of Groupe E, not at stations of Primeo Energie

Results Electro Mobility Providers

Provider / Offering	EnBW Mobility+	Maingau	Shell Recharge	Germany Alpiq	Austria Smatrics	Switzerland Move	Switzerland Swisscharge
<b>Web</b>	www.enbw.com/elektromobilitaet	www.maingau-energie.de/e-mobilitaet	www.shell.de/autofahrer	www.alpiq.de	smatrics.com	www.move.ch	www.swisscharge.ch
Number of supported charging points in D: HPC (min. 150 kW) / DC / AC	937 / 3478 / 29807	1300 / 3400 / 27000	1300 / 3000 / 29807	1012 / 2424 / 14555	1310* / 899 / 16128	1175 / 2166 / 15408	757 / 363 / 22880
Number of supported charging points in A: HPC (min. 150 kW) / DC / AC	108 / 765 / 6780	200 / 450 / 5000	200 / 765 / 6780	163 / 366 / 3175	69 / 443 / 3659	148 / 303 / 3314	300 / 300 / 4650
Number of supported charging points in CH: HPC (min. 150 kW) / DC / AC	24 / 467 / 4063	200 / 600 / 4100	240 / 467 / 4063	242 / 522 / 1867	29 / 15 / -	289 / 551 / 3658	280 / 280 / 5040
<b>App: Handling</b>							
Available for Android/iOS	+/+	+/+	+/+	+/+	+/+	+/+	+/+
Level of Difficulty Operation	very good	very good	very good	satisfactory	very good	very good	very good
Tutorial / Charging Instructions	+/+	+/+	+/-	+/-	+/+	+/-	+/-
Map integration	+	+ (Mapbox)	+	+	+	+	+
Location nearby / Location available in route guidance	+/-	+/-	+/-	+/-	+/-	+/-	+/-
<b>App: Functions</b>							
Charge Point available or occupied: Real time info / Filter	+/+	+/+	+/+	+/+	+/-	+/+	+/+
Reservation / share address / Interface to onboard satnav	+/-	+/-	+/-	+/-	+/-	+/-	+/-
Filtering according to Wattage / Plug type	+/+	+/+	+/+	+/+	+/+	+/+	+/+
Info: Current Wattage / Charged kWh / Charging time / History	+/-	+/+	+/-	+/+	+/-	+/+	+/-
<b>Payment/Price Transparency</b>							
Price information before / during / after charging procedure	+/-	+/+	+/+	+/+	+/+	+/+	+/+
Clarity of pricing structure / Transparency of roaming	v. good / v. good	satisf. / very good	suff. / v. good	good / v. good	good / v. good	good / v. good	suff. / v. good
Billing via credit card / SEPA direct debit / PayPal	+/+	+/+	+/-	+/-	+/-	+/-	+/-
<b>Test results</b>							
Points Charge Point Coverage (max. 200)	satisfactory (148)	good (161)	very good (171)	satisfactory (136)	insufficient (79)	satisfactory (147)	satisfactory (143)
Points App Handling (max. 200)	very good (190)	very good (173)	satisfactory (150)	insufficient (88)	good (170)	satisfactory (150)	satisfactory (150)
Points App Functions (max. 300)	good (253)	satisfactory (200)	satisfactory (225)	insufficient (147)	sufficient (182)	satisfactory (210)	satisfactory (225)
Points Payment/Price Transparency (max. 300)	very good (260)	very good (260)	good (230)	satisfactory (200)	very good (270)	very good (270)	good (255)
<b>connect</b> VERDICT max. 1000	851 very good	794 good	776 good	571 sufficient	701 satisfactory	777 good	773 good

Errors and omissions excepted \* Charging points above 50 kW



Methodology

Our assessment is based on thousands of test kilometers with frequent charging stops, during which umlaut's testers have tried and logged the charging experience.

Analogical to cellular communications, charging infrastructure differentiates between network operators (Charge Point Operators, short CPOs) – the actual operators of the charging stations – and service providers (Electro Mobility Providers, short EMPs), who contribute apps and billing platforms. Some companies such as EnBW, Smatrics or Move play both roles and were consequently considered in both categories of our testing.

In order to make the assessments, test teams drove through Germany, Austria and Switzerland (see routes and schedules on pages 88 and 93), visiting between three and five charge points of each rated CPO.



umlaüt's team: (from left to right) e-mobility consultant David Trinkewitz, connectivity consultant Darani Yoga-lingam, e-mobility consultant Adrian Brinster and CEO Hakan Ekmen. The Hyundai Ionic was not used in the test.



As far as possible, logging in at the charging location and billing were performed via the assessed EMPs. During charging their test cars, the testers filled out extensive protocols about the location, the charging operation as well as about possibly occurring errors. Moreover, they contacted the operators' hotlines during the charging in order to assess their service quality. As in all our network tests, the actual charging tariffs are not subject to the assessment.

A more detailed description of our methodology (in German language) can be found at [www.connect.de/3201244](http://www.connect.de/3201244) or via the QR code printed below.



Scan the QR code for a more detailed description of the methodology.

Step by step: The test routes were designed to facilitate sensible re-charging.

Fazit

Hannes Rügheimer, connect author



Even if Corona times did not offer the best circumstances for a charging network test spanning three countries, the overall results are pleasant. EnBW, Maingau, Shell, Move and Swisscharge offer convincing performances in the EMP roles, Ionity shone with offering the best charging performance in all three countries – nota bene without consideration of the occurring costs. EnBW and Fastned in Germany, Da emobil and Kelag in Austria as well as GoFast and Move in Switzerland also show appealing performances. With some minor flaws, this also applies to the other rated CPO candidates, who all were awarded the grade "satisfactory".

Outages and glitches can always happen, and random samples as examined by us can always involve unfavourable coincidences. Still: When, such as at EON and Comfortcharge in our test, even two locations fail, this is not beneficial to increasing trust into e-mobility.