

History: How did Juice Technology get started?

Every so often, paths cross and forever change the course of events. Christoph Erni, an established figure in the corporate world with his own business consultancy, was dining with clients one day when a table mate, "a true eco-fundamentalist" with a sense of mission, lectured him in the one and only right way of locomotion. While touting the use of public transportation as the solution to all mobility problems, in the same breath he asked if Erni could drive him to the airport, as he was booked to fly to Bali "for a cultural exchange".

Just a short time later, a business partner told Erni of an entrepreneur hailing from Silicon Valley who intended to build exclusively all-electric-drive cars. Spurred on by the annoying inconsistency of his ecological zealous dining partner, the passionate petrolhead Erni opted to take action and, in 2010, ordered his first electric car – a Tesla. However, his thrill of anticipation was soon joined by derision from friends and acquaintances when it took three full years before his new Model S was finally delivered.

The Tesla came with two charging plugs, neither of which fit Swiss power-outlet sockets. So, from a building supplies store Erni purchased an adapter – which promptly melted the very first night of charging: it simply wasn't suited for charging an electric car. After some initial disgruntlement, his follow-up detective work on the Internet led Erni to the fitting adapters and cable sets. After all, by now the e-car had won him over, and he wanted to keep his Tesla. Alone the sensation of driving – the ride – was far superior to anything he'd ever known with petrol-fuelled cars, even with manual-transmission eight-cylinder engines.

Erni's colleagues began encouraging him to lend other novice e-car enthusiasts a helping hand. While the excitement about all-electric cars from Silicon Valley was initially derided as a fantasy of some tech daydreamer, a handful of early adopters were indeed ready to make the jump. Charging opportunities, too, were few and far between in those days, still in a fledgling stage. What's more, the only charging cables available on the market were of extremely poor quality. Erni began sharing his research results in forums for electric mobility, and his postings met with broad interest. Bombarded with countless requests to purchase such equipment, he began to assemble and sell fitting adapter sets himself. Boosted by this commercial success, he resolved to start developing his own products, thereby laying the foundations in 2014 for establishing Juice Technology AG.

Though the first product he developed, the JUICE BOOSTER portable charging station, was just a plainly designed box, it enjoyed resounding success. The new company thereby secured the pole position for portable 22-kW charging stations already in its first year of business, and still holds the lead in this segment. This is hardly surprising, as electricity is available everywhere – you just need the right solution to make it accessible.

The second version of this charger delivered the real breakthrough: with its new design and improved functions that



simplify charging operations even for novices, the JUICE BOOSTER 2 has become a runaway best-seller. Today, the BOOSTER is marketed by multiple renowned auto manufacturers under their own brand name. It's easy to operate, the accompanying adapters enable its use everywhere, and it's safe and reliable. Whether it sits for 20 years in your car boot and is used only once, or serves daily as a mounted wallbox charger in your garage: what's decisive is that it functions perfectly in any situation – like a Swiss pocketknife.

Today, the Juice Group enjoys worldwide presence with its own locations, subsidiaries and partner companies. The Juice corporate Group includes Juice Services AG, Juice Telemetrics AG, the German firm Juice Europe GmbH headquartered in Munich, Juice Iberia S.L. based in Málaga, Juice France SAS with seat in Paris, Juice Nordics AB based in Uppsala, Sweden, Zhejiang Juice Technology Co., Ltd in Hangzhou, China, and Juice Americas Inc. in the US state of Delaware. The Group also has a global network of resellers at its disposal. The company currently employees a global workforce of over 200 people active in research and development, production, marketing, administration, purchasing, sales and logistics. In 2021, Juice Technology AG moved into new headquarters at the company's Bachenbülach location near Zurich Airport in Switzerland, where the company also maintains its Research and Development Centre.

Awards





Company profile

Who are Juice?

- The market leader in portable EV charging stations
- A lifestyle brand
- A software company
- One of the few full-range vendors in the industry

What does Juice stand for?

- Swiss precision
- High quality at a good price-performance ratio
- Products with customer focus: charging an e-car must be as easy as charging a smartphone
- Intuitive, safe and reliable operability of all its products

What distinguishes Juice from other vendors?

- Consistent, systematic software orientation
- Sustainably future-proof charging concepts that go beyond individual charging stations, such as the smartJuice charging and load management software
- A holistic approach offering convergent solutions with the j+ pilot app as acting as central hub
- Comprehensive expertise in all advancements driving electric mobility

About the founder and CEO

"Electrical charging must be simple, safe and reliable – life is already complex enough." Christoph Erni

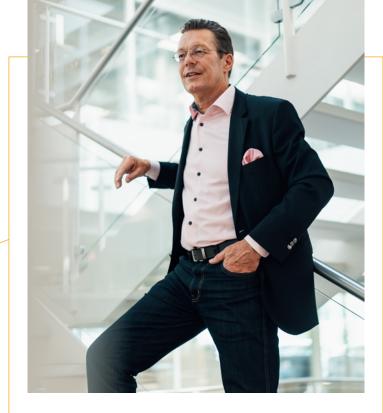
A constant eye for safety and reliability

In order to successfully introduce and establish verifiability, uniform directives and guidelines and, especially, consumer safety in any new market or a new industry, you need a pooled coalition of diverse experts to jointly develop and mainstream such definitive standards. The International Electrotechnical Commission (IEC for short) is the organisation responsible in collaboration with the European Committee for Electrotechnical Standardization (CENELEC) for developing and issuing such standards in the fields of electrical engineering, electronics and related technologies. These standards are developed in hundreds of working groups, each of which is responsible for a specific field of technology. Anyone wishing to join these efforts and pro-actively help shape the industry's development, however, must apply to and be admitted to the official standards committee.

Juice Technology's CEO Christoph Erni has been a member of the Swiss committee for the standards

▶ IEC 61851 (governing stationary charging systems) and ▶ IEC 62752 (portable charging stations) since 2015. As of 2019, he likewise sits on the associated German committee, and since 2017 on the international committee for standardisation of portable charging stations. In 2021, Erni was successfully admitted to the international committee for the IEC 61851 standard.

Yet, what exactly goes on in such committees, and how and to what extent does their work impact markets, industry development and competition? Christoph Erni gladly answers these questions for you from his standpoint as a manufacturer who keeps an eye on user practice.



Christoph Erni's CV

Christoph Erni is the founder and CEO of Juice Technology AG, the Swiss manufacturer of charging stations and solutions. Always a rather down-to-earth, practical minded person, Erni left sixth-form college shortly before graduating with a Swiss university-preparatory Matura diploma to instead pursue business management training in a vocational secondary school – and soon found his calling in the IT sector. But this wasn't enough for Christoph Erni: he wanted more! Around 20 years ago, he set up his own business consultancy, Erni Associates AG. Noticing the lack of decent charging solutions in 2014, he made a snap decision to enter the manufacturing business and founded Juice Technology AG. The company secured pole position in this segment in its very first year of business with the JUICE BOOSTER 1 portable 22 kW charging station – and it has stayed there ever since.

Mission & impact:

Where is the journey leading?

Phased development of mobility according to **Lars Thomsen** (Chief Futurist for the Zurich-based firm future matters AG and member of the Board of Directors of Juice Technology)

Where do we stand today in terms of electric mobility?

Electric vehicles accounted for some 20% of new car sales in Europe in 2021.

In the five largest European markets (France, Germany, Italy, Spain, and Great Britain), the market share claimed by e-vehicles (including all-electric vehicles, plug-in hybrids and conventional hybrid EVs) rose from 8% in the year 2019 to 38% in 2021.

→ Electric Vehicle Sales Review Q4-2021

In September 2021, Tesla's Model 3 became the first all-electric car to be crowned best-selling car in Europe (based on all drive types). A JATO Dynamics

While the market for diesel- and petrol-fuelled drives in new vehicle registrations for road use is shrinking, the share held by "plug-in vehicles" is growing at double-digit rates.

→ Carpixx's Oldtimer Blog

Forecasting future developments in the electric mobility and charging markets in Europe and the United States:

The share of electrified vehicles in Europe (BEV and PHEV combined) will exceed the numbers of newly registered diesel- and petrol-fuelled vehicles already in the first half of 2023. In virtually all vehicle segments and classes, electric vehicles will reach a tipping point by 2025 where their attractiveness in terms of both economics and comparative performance clearly overtakes of their internal-combustion-engine counterparts heading towards phase-out. E-vehicle ranges are increasing, while charging times are steadily shrinking, and charging opportunities in both the public and private spheres becoming more and more the norm. Thanks to the growing competition, decreasing prices and broader range of vehicles on the market. EVs stand to gain steadily greater dominance in the high-volume mid- and low-price segments. E-cars will become more attractive even for city-dwelling buyers who have no parking space or charging opportunity of their own, as the range of most e-cars today and in future under normal, average use as an in-town or commuter car means you can drive seven to ten days before you need to recharge, and can then do so within 30 minutes at a shopping centre, at your

workplace, or in the supermarket car park.

China has meanwhile reached a staging point for tapping into and scoring on the European and US markets with new (and highly attractive) all-electric cars and PHEVs. At least six Chinese car brands are expected to launch multiple models on both markets by 2025. The move will simultaneously stimulate even more the already hotly expanding US market for electric cars, which has grown by 190% over last year. China will remain the world's largest BEV market right up until 2026.

The US anticipates a surging market for EVs and PHEVs as well as charging infrastructure beyond the hot spots so far. Especially the simultaneous entrance of multiple players such as Ford, Rivian, Tesla and others into the most important US market with pickup trucks will power a jump of over 15% in the EV share of new-car registrations in the United States starting in mid-2022. Depending on the availability of batteries and vehicles, the EV share in new car sales in the United States will rise to 40% or higher by 2025. In this same time frame, the volume of EV charging technology on the US market could increase twenty-fold or more compared to today. The call by public policy-makers for renovating infrastructure and explicitly for promoting electric mobility could accelerate this already ongoing transformation even further.

The success of PHEVs will not last long, and the end of this category is already in sight, at least in Europe. Their consumption figures, privileges and tax breaks can no longer be maintained owing to the disappointing use of the charging function on the grid among the fleet to date. There is talk already at the European level to link privileges and tax breaks with the actual usage share of the electric drive.

As e-vehicle ranges increase, fast-charging networks steadily

expand and charge with increasing speed, and pricing advantages grow, the market will begin tipping in favour of BEVs already from 2024 onwards such that PHEVs will hardly be economically marketable for the industry as of 2028.

Multiple trends are taking shape in the charging infrastructure sector.

For AC charging in Europe, three-phase 11-kW charging devices are winning out as the most frequent solution: at the vehicle end, this size of on-board charger is easily installed and capable of fully charging batteries with 80 kWh or more overnight.

For installations in private garages, communally owned parking facilities or public car parks, this performance output is the optimum compromise of cost and utility. In the United States, 40A/240V connections are taking the lead.

For direct-current charging, the Combined Charging System (CCS) connection delivering up to 350 kW of charge power is the standard along motorways. Installations offering 50 to 100 kW are coming into use in public parking structures, etc., in urban settings, and at points of interest.

By 2024, practically every motorway service area in Europe will be outfitted with fast-charging connections, entailing enormous investments for the facility operators. These costs will be passed on to users in the form of relatively high prices per kilowatt-hour (kWh), unless the users conclude a premium contract with the given operator for a monthly base fee. Current forecasts project that three to five networks will form across Europe that compete for long-term customer retention similarly to today's mobile phone network operators. Data on charging behaviour, trips taken and added-value services (insurance, coupons, club offers, etc.) will be come an important element for all players in this market.

If and to what extent this scenario with fast-charging stations in service areas and providers along the lines of mobile network operators can be transferred to other nations around the globe depends in every country on how electricity prices are determined there. The models will vary slightly, depending on the price volatility based on the type of power generation. Besides a subscription component for customer retention, a variable rate portion will also be at play reflecting the widely fluctuating grid feed-in of electricity generated from natural energy resources like solar and wind power, thus influencing the customer's choice of what time of day or night to charge.

However, charging at home or at the workplace with AC power will always be a less expensive alternative for users, as by 2025 a growing number of variable charging rates will be offered that lower the price for grid-supportive charging: depending on the volume of renewable energy available on the grid, the time of day or night, and grid utilisation, charging at such times will automatically cost less. There are technical, economic and environmental reasons for this, and benefits which are brokered by partially automated (intelligent) charging planning between the vehicle, charging station operator, and grid operator.

With the arrival of autonomous and semi-autonomous vehicles which in future will drive themselves to charging (or parking washing, maintenance opportunities, etc.), fully automated charging stations (equipped with robotics) can be expected to appear as of 2025. While autonomous vehicle fleets will be the trail-blazers here, we'll also see rental car fleets and customers with vehicles equipped with full self-driving technology often leaving the trip to the charging station up to the car itself.

Mission & impact:

The impact of Juice on the development of electric mobility

What are the biggest challenges facing electric mobility today?

Range anxiety: the unjustified fear among car owners so far fully unfamiliar with electric mobility that the range of electric cars is inadequate for many trips, necessitating frequent, time-consuming charging operations, or potentially leaving drivers stranded on the roadside with an empty battery for lack of charging infrastructure.

- ► From a scientific perspective, range anxiety is predominantly viewed to be unfounded and highly emotionally driven. The average European auto driver travels between 30 and 40 km per day. Depending on the vehicle, one full recharge is sufficient to operate an EV for up to a week.
- ↗ Institute of Energy Economics at the University of Cologne
 Ż Wolfgang Reimann, Udo Wehner, and Mirko Taubenreuther:
 Das Spiel mit der Reichweite Wechselwirkung von Automation und Elektromobilität ("The game with the range correlation of automation and electric mobility"). In: 10 Years of ATZelektronik,
 Special Issue 7/2015. 1 September 2015, pp. 58–61.

Change of thinking when charging: The mobility transformation from internal-combustion-engine vehicles to electric cars is a major paradigm shift – one that necessitates jettisoning old customs and habits.

► Now, rather than making a special trip a petrol station, you'll recharge your car right where it's parked anyway for longer periods of time – usually at home or at your workplace.

Grey energy: the accusation that electric cars aren't environmentally compatible because the life-cycle assessment of their manufacture is higher than that of ICEVs.

- ► If you consider the entire life cycle for this carbon footprint comparative, including car manufacture and provision of fuel or electric power, an electric car charged from the European power mix
- (A Agora Energiewende think tank) clocking up the same mileage as an ICEV generates only about two thirds or even just half of the emissions of an ICEV.
- Paul Wolfram, Stephanie Weber, Kenneth Gillingham et al.: Pricing indirect emissions accelerates low-carbon transition of US light vehicle sector. In: Nature Communications, Volume 12, Article Number 7121. 8 December 2021
- → Carculator Life-cycle assessment tool for cars

Blackout: Disaster scenarios that warn of a threatening failure of the public power grid if a steadily growing number of electric cars are licenced for road use.

► Intelligent charging stations fitted with a dynamic charging and load management system distribute charging loads uniformly, facilitate grid-supportive charging, and protect the grid against overloading.

How is Juice helping these efforts? Study: Level of use of electric vehicles

Study: Level of use of electric vehicles as function of charging situation

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As part of a study carried out in collaboration with the Zurich University of Applied Sciences (ZHAW), Juice Technology AG has been investigating interdependencies between the use of battery-powered all-electric vehicles (BEV) and the individual charging situations of e-drivers The aim was to find out whether a good range of charging opportunities has a positive impact on how e-drivers use and drive their electric vehicles, and whether such influence can consequentially reduce CO_2 emissions, too. A direct correlation has meanwhile been scientifically confirmed.

An on-line quantitative survey questionnaire targeted a total of 5,000 in Germany, Austria and Switzerland – irrespective of socio-demographic factors – who use a (JUICE BOOSTER 2) portable charging station from Juice Technology AG. The survey was conducted between 27 September and 12 October 2019, and generated a respondent return rate of 11.26 percent.

The study at a glance:		
Population:	5,000 sampled population	
Response rate:	563 respondents (11.26%)	
Method:	On-line survey in German by multiple-choice questionnaire	
Survey period:	27 September to 12 October 2019	
Sample population:	Persons in Germany, Austria and Switzerland who purchased the JUICE BOOSTER 2 por- table charging station via an on-line webshop in 2018 or 2019.	
Evaluation:	Simple descriptive statistics	

The most important survey results at a glance

Comparing user behaviour of battery electric vehicle (BEV) versus internal-combustion-engine vehicle (ICEV): Did the availability of the JUICE BOOSTER 2 influence your decision to acquire an electric vehicle?

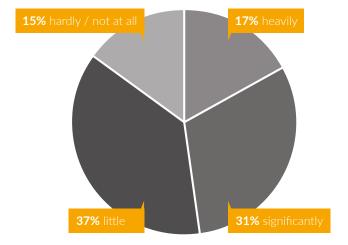


Figure 1: 85% of the JUICE BOOSTER 2 users confirmed that owning a portable charging station had a positive influence on their decision to dispense with ICEVs either in part or entirely. For BEV users, it's particularly important to be able to charge anywhere, from any power socket-outlet, at any time.

Change in usage habits: How many kilometres less are you driving in (diesel- or petrol-fuelled) internal-combustion vehicles as a result?

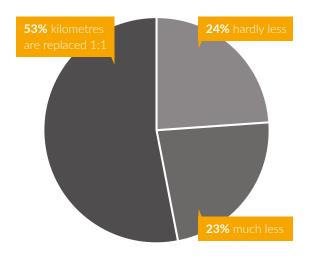


Figure 2: 53% of those surveyed responded that they would give up using internal-combustion-engine vehicles in favour of all-electric vehicles just as soon as they have a portable charging station.

Usage effect: Did your purchase of the JUICE BOOSTER 2 reduce what is termed your range anxiety?

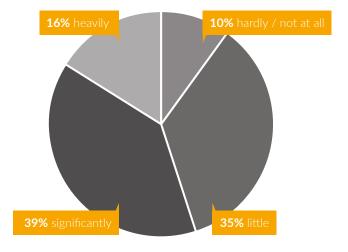


Figure 3: The range anxiety of 90% of the BEV drivers diminished after purchasing a JUICE BOOSTER 2 – while 55% felt their range anxiety dropped substantially or even sharply.

The most important survey results at a glance

Battery-powered all-electric vehicles (BEV) consume less energy than internal-combustion-engine vehicles (ICEV) to travel the same distance, and their operation discharges zero local CO_2 emissions. The carbon emissions of BEVs over their entire lifecycle are significantly less than those of ICEVs of the same performance category. The more kilometres driven by BEVs instead of ICEVs, the greater the reduction in CO_2 emissions, and the better the life-cycle assessment.

An improved electric charging landscape enhances vehicle road performance. A portable AC charging station enables drivers to charge anywhere at any time from any alternating current power sockets, thereby improving the charging situation. The availability of portable charging stations spurs greater use of electric vehicles and, when drivers make the switch from ICEVs to BEVs, reduces CO_2 emissions, ultimately leading to more ecologically sound mobility.

Further insights:

- Almost three quarters (73%) of the survey respondents state that the availability of their e-vehicle allows them to completely dispense with a petrol-fuelled car.
- A clear majority (62%) use the JUICE BOOSTER 2
 daily or multiple times weekly as their main charging device,
 while one quarter of respondents even use it exclusively for all
 their charging needs.
- More than four out of five (83%) of the study participants use their e-car more often and/or for longer trips since acquiring a portable JUICE BOOSTER 2 wallbox for their EV.

How is Juice helping these

efforts?

Empirical study: Charging behaviour and electricity preference of users of electric vehicles

R&D Department Juice Technology AG

The charging behaviour and preferred power source of drivers of battery electric vehicles were determined in a quantitative survey. The aim was to find out whether e-car owners currently have or are developing an enhanced awareness of environmental responsibility. The indicators used as metrics were driver use of electric power from renewable energy sources to charge their e-vehicles (irrespective of the original energy mix), and their willingness to pay more for green electricity over power from conventional fossil-fuel sources.

An on-line quantitative survey questionnaire targeted 5,154 people in total in Germany, Austria and Switzerland – irrespective of socio-demographic factors – who drive electric vehicles, generating a respondent return rate of 11.2 percent. The survey was conducted between the 12th and 14th of October 2019.

The study at a glance:		
Population:	5,154 sampled population	
Response rate:	576 respondents (11.2%)	
Method:	Quantitative on-line survey in German by multiple-choice questionnaire	
Survey period:	12 October to 14 October 2020	
Sample population:	Persons in Germany, Austria and Switzerland who use electric-drive vehicles (EV)	
Evaluation:	Simple descriptive statistics	

The most important survey results at a glance

Charging habits: Where do you charge your electric car?

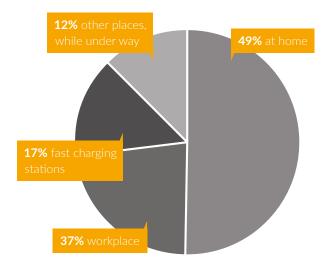


Figure 2: The electric power for almost three quarters of the total annual mileage clocked every year by the survey respondents is charged either at home or at their workplace.

Source of charging power: How important is it to you to charge exclusively with clean power?

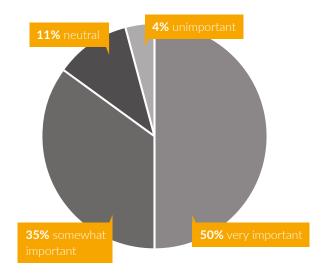


Figure 2: The vast majority – some 85% – state that it's important to them to charge with clean power.

Willingness to pay: Are you willing to pay more for clean electric power generated in real time than the standard electricity rate?

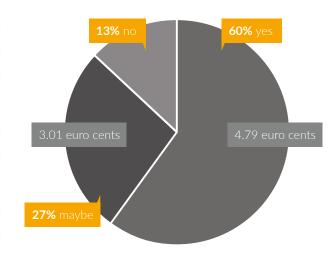


Figure 3: 87% of the survey respondents are interest not only in clean energy, but also in clean energy generated simultaneously at the time of consumption (i.e. during charging). The added cost compared to the conventional electricity mix may range between 3 and almost 5 euro cents per kilowatt-hour of power.

The most important survey results at a glance

The survey results demonstrate that the drivers of electric cars place importance on using clean power for their vehicle, irrespective of the original energy mix. Although only 28% of the conventional German energy mix originates from renewable energy sources, 70% of the study participants procure 100% of their charging power at home from clean, renewable sources. 30% of the survey respondents have even invested in their own photovoltaic solar power system. One half of the total kilometres driven are powered by charging at home. Against this backdrop, it's not surprising that 85% consider access to clean energy generated in real time as either very important or rather important. The study participants are on average willing to pay 3 euro cents or more per kilowatt-hour for this added value.

Further insights:

- E-car owners use much cleaner energy to drive their vehicles than the average energy consumer.
- Half of all kilometres driven are powered by electricity charging at home, where already today 89% of the energy consumed is sourced entirely or in part from renewable resources.
- Owners of electric vehicles are open to further improvements favouring the use of new, clean energy concepts.
- They're also prepared to pay more for clean energy.

Products



Juice Technology AG, which is based in Bachenbülach, Switzerland (near Zurich airport), is a global manufacturer of charging solutions for electric vehicles. The company's extensive product portfolio includes both AC and DC charging stations and extends from light mobile devices to large quick chargers. Juice has dominated the global market for mobile 22-kW charging stations since 2014 and is one of the industry's few full-range suppliers.

User friendliness is at the heart of all product development at Juice Technology. All products are designed and created with a clear focus on the user in order to ensure intuitive and efficient operation. With its consistent software orientation, Juice pursues the objective of making all charging stations compatible with each other and integrating them into a universal software ecosystem. This strategy not only maximises usability but also saves a great deal of time, effort and costs – both in development and in installation and application.

Overview of market innovations

JUICE CELSIUS: Our own in-house development for safe and reliable operation

A temperature sensor in the household adapter monitors the temperature at the plug pins and detects any overheating to enable the JUICE BOOSTER 2 to shut charging down in a controlled manner. The JUICE CELSIUS there protects against cable fires and fire damage to buildings.

▶ Press release

Payment by credit card: Initial launched in 2019 to maximise customer benefit

Instant payment system direct at the charging station enabled by near-field communication (NFC) and radio-frequency identification (RFID). Possible to pay with any credit card as well as by smartphone (with Apple Pay or Google Pay).

Press release

Plug and Charge: Integrated in series production in the JUICE CHARGER me, even before it becomes the general standard

Thanks to the new communication standard as defined in ISO 15118, the charging process is executed fully automatically immediately after connecting the e-car to the charging station.

→ Press release

Products:

Overview





JUICE BOOSTER 2





Stationary

Fast





Software solutions

JUICE ULTRA 2





Products:JUICE BOOSTER 3 air



The JUICE BOOSTER 3 air is a smart, mobile 11-kW wall box with 7-in-1 functionality. Its compact dimensions and light weight make it the ideal companion for on the road.

It is the first charging station from Juice that can be integrated into the j+ pilot app. This enables convenient remote monitoring and management of the charging process, allowing you to activate charging and control the duration or power level. Dynamic load management for up to ten devices is integrated as standard. The digital current meter logs the amount of electricity charged, and the charging history can then be exported as a receipt. In addition, the app gives you an insight into your charging statistics and driving behaviour, while Juice Power allows you to use electricity generated in real time for charging purposes. Wi-Fi connectivity paves the way for additional functions. Thanks to over-the-air updates, the device can be adapted to future requirements and upgraded with new functions.

It is completely dust and waterproof (IP67), and with a wheel load of up to three tonnes, it can withstand being driven over (IK10). The device is also compatible with all cars fitted with a Type 2 connector. Thanks to an extensive range of adapters, it can be used for charging at any conventional household and industrial socket or at public charging points (Mode 3 charging cable) worldwide. The automatic adapter recognition ensures straightforward and safe handling. The JUICE CONTROLLER is the user interface, which is integrated into the vehicle's Type 2 connector. It has a button for controlling the charging level and an RFID reader for activation.

The detailed fault current detection with easy-to-read LED display ensures comprehensive safety. More than ten types of fault are reliably detected – including external ones. Incorrectly wired sockets are identified, as is any exceedance of the car's current consumption – as set on the device. The integrated RCD protection means that there is no need to install an expensive type B residual current device in your home.

- → juice.world/jb3air
- → YouTube: Introducing JUICE BOOSTER 3 air
- ▶ Press release

Awards





Products:JUICE CHARGER me 3

With an edge length of 28 cm and a depth of 12.5 cm, the JUICE CHARGER me 3 is very compact. A 5 m cable ensures the necessary flexibility. Behind its front section, which is made from scratch-resistant, internally printed and replaceable acrylic glass, is a tightly screwed inner casing. This is completely waterproof and dust-proof according to IP67, and exceptionally shock-resistant

according to IK10. This means that the charger is equally suitable for indoor and outdoor use.

The wallbox can be wall-mounted in the usual way – in the form of either on-wall or in-wall installation. The device can also be installed individually or in pairs on a separately-available column. The JUICE CHARGER me comes completely pre-configured ex-works, is very easy to install, and is ready for immediate use ('Plug and Play').

The wall charging station is also configured for the 'Plug and Charge' standard. For all vehicles that already have the ISO 15118 standard and have previously been registered with the vehicle ID on the charger, the charging process can be activated automatically as soon as the charging plug is connected to the vehicle socket. Alternatively, activation via an RFID reader, which is located behind the front panel, is possible.

Local dynamic charging management is included for up to 250 charging stations. The JUICE CHARGER me 3 is optionally available with a MID-certified meter, and optionally with a built-in FI/LS (fault current/line circuit breaker) – prepared for direct connection to busbars or flat ribbon cables.



- → juice.world/juice-charger-me-3
- → YouTube: JUICE CHARGER me 3 –
 the wall box for every condition
- Press release Red Dot Design Award
- Press release iF Design Award

Awards



reddot winner 2022





Products:JUICE BOOSTER 2



The plug adapters supplied with the JUICE BOOSTER 2 enable you to charge your electric car from any conventional household or industrial power socket or public charging station anywhere in the world.

This charging device is equipped with automatic detection of socket input current, ensuring it's always set to optimum charging power, and ruling out any overloading of power socket capacity.

The JUICE CELSIUS automatic protection against overheating continuously monitors the temperature at both plug pins of all the JUICE BOOSTER 2's household socket adapters.

The JUICE CONNECTOR plug connection with automatic adapter recognition is Juice's proprietary interface for all Juice adapter plugs, extension cables and expansion units such as the JUICE PHASER and JUICE CHARGER easy. These connector parts are coded and thus reverse-polarity-protected. The JUICE CONNECTOR is fitted with leading contacts to an earth conductor and control pilot (CP: connection for transmission of control signals between the electric vehicle and charging station), thereby offering maximised application safety and reliability. The plug connection is designed such that it can also accommodate future functions.

The JUICE BOOSTER 2 ...

- ... is absolutely waterproof (IP 67) and can withstand being run over by up to three tons of wheel load.
- ... is also equipped in its Pro version for commercial use with exchangeable vehicle-end adapters for Type-2, Type-1 and Type-GB plugs.
- \dots is the world's first portable charging station of the 22-kW performance class to be successfully tested by TÜV SÜD to the IEC 62752 first-edition standards of 2016, including Amendment 1 of 2018.

- → juice.world/juice-booster-2
- → YouTube: JUICE BOOSTER 2 The MOBILE Wallbox
- ▶ Press release: Certification by TÜV SÜD authorised inspection agency
- Press release: ADAC test winner

Patented temperature monitoring

The JUICE BOOSTER 2's household adapters are all equipped with the patented JUICE CELSIUS temperature monitoring system, ensuring absolutely safe and reliable charging even from normal household socket-outlets. The integrated temperature sensors communicate with the JUICE BOOSTER 2 charging station via the JUICE CONNECTOR plug connection. If the plug detects any potential overheating, it immediately transmits a signal to the portable charging station, which is then able to shut down the charging process in a controlled manner. This prevents any potential damage to the power socket or the electric car's battery. Once the temperature of the overheated pins has dropped to a normal level, the charging operation re-starts.

- → Press release: Schuko plug fitted with JUICE CELSIUS
- → Press release: Further household plugs fitted with
 JUICE CELSIUS

Awards











Products:JUICE ULTRA 2



The JUICE ULTRA 2 is a flexible DC fast charging station for electric cars and commercial vehicles. With its modular design, the high-power charger (HPC) enables charging capacities of up to 500 kW. It is available in three versions – slim, large und hub – to suit the space and performance requirements of different locations. All models impress with their reliable functionality, simple installation and low maintenance.

Due to its large cross section, the DC charging cable has a low resistance, which minimises heat development and thus eliminates the need for liquid cooling. The maintenance-free air cooling of the DC cables is sufficient for trouble-free operation without any performance losses. The lack of an active cooling system also reduces energy consumption, and since no coolant is used, there are no environmental restrictions to consider either.

The pin-sharp 7" colour display ensures maximum ease of use. Charging is activated either via RFID or Plug and Charge (according to ISO 15118), while an optional NFC terminal is available for making contactless payments via debit/credit cards or using mobile payment services.

The JUICE ULTRA 2 ...

- ... is available in three versions: slim, large and hub.
- ... enables rapid charging at 2 DC charging points (CCS2) simultaneously (with up to 500 kW = 2×250 kW).
- ... has an additional AC socket for charging a third vehicle with up to 22 kW
- ... supports all common charging standards of automotive manufacturers, making it suitable for both electric cars and electric commercial vehicles.
- ... is vandal-resistant (IK10) and protected against dust and splash water (IP54).
- ... features dynamic load management, which monitors and controls the energy distribution in real time.

→ juice.world/ju2

Products: JUICE ULTRA 2 battery



With the DC charging station JUICE ULTRA 2 battery, rapid charging is much simpler and more affordable than with traditional DC solutions. The HPC (high-power charger) is connected directly to a standard industrial socket (CEE32, CEE63 or CEE125) without the need for elaborate construction work – the house connection remains untouched. The power output of up to 210 kW can be spread across two CCS charging points thanks to the intelligent load distribution. The 233-kWh battery offers sufficient capacity for six normal charging operations as standard and is rapidly recharged once depleted. This output is doubled by the larger model with its increased capacity of 466 kWh.

The energy storage system is charged either evenly throughout the day or only at off-peak times with cheaper electricity tariffs. The continuous electricity supply to the lithium-ion batteries helps to prevent load peaks and minimises the load on the network. As a result, much lower fees are incurred from the grid operator, which in turn leads to significant cost savings. At the same time, a high charging capacity can be achieved despite the low mains input power.

The clever energy management system of the JUICE ULTRA 2 battery allows electricity from PV systems to be stored and used for charging electric vehicles without the need for additional installations. The generated solar power is first used for internal consumption within the building before being made available for charging the JUICE ULTRA 2 battery.

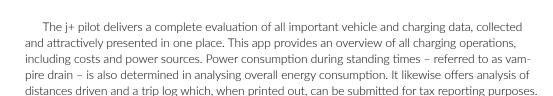
Charging the energy storage system at off-peak times helps to reduce costs. When used as a public charging station, the electricity can be sold at higher prices during peak times for maximum profit. To this end, a credit card terminal is available for simple payment processing.

The JUICE ULTRA 2 battery ...

- ... revolutionises the world of DC fast charging stations.
- ... enables rapid charging without the need for installation.
- \dots delivers maximum charging capacity (with up to 210 kW) with limited input power.
- ... allows fast charging at 2 DC charging points (CCS2) simultaneously.
- ... features an integrated battery for optimum charging performance.
- ... is quickly connected to a standard red industrial socket.
- ... enables effortless PV surplus charging.

→ juice.world/ju2b

Products: j+ pilot



This app is being continuously expanded so that in future it will enable not only control of charging stations, but also vehicle fleet management.



- → YouTube: j+ pilot The co-pilot for your e-car
- ↗ Press release
- → YouTube: Juice World Charging Day 2020
- → YouTube: Highlights Juice World Charging Day 2020

Awards





Features

Already integrated:

- Overview of vehicle data
- Administration of charging stations
- Analysis of trip data
- Driving style analysis
- Minimisation of CO₂ footprint
- Logbook

- Analysis of power consumption
- Energy recovery through recuperative braking
- Vampire drain
- Battery degradation
- Overview of charging costs

Coming function expansions:

- Monitor and record power consumption in buildings
- Managing vehicle fleets
- Integrating a home energy storage system or solar power production
- Using Juice Power to charge with electric current generated in real time from renewable energy sources

Success Stories

Juice collaborates with renowned automotive manufacturers in its development and production operations as well as in the end-customer segment, and made a name for itself as an original equipment manufacturer-supplier. The charging solutions from Juice have also been awarded numerous prizes. Here are some of the major successes at a glance:

→ Success Stories



Hyundai

The JUICE BOOSTER 2, JUICE CHARGER 2 and JUICE PHASER can be procured via the Hyundai configurator or from the accessories page at the Hyundai Switzerland website.



Daimler

Mercedes-Benz Customer Solutions, the after-sales business of Daimler, has added the JUICE BOOSTER 2 to their product range as a white label product available throughout Europe.



BMW

The JUICE BOOSTER 2 is used at BMW's automotive development and production locations all across Germany.



Opel/Stellantis

Juice is a tier-one supplier to Stellantis. The JUICE BOOSTER 2 can be ordered in the Opel configurator under the name UNIVERSAL CHARGER.



Rimac

Owners of the Rimac C_Two hypercar have a simple, versatile charging solution at hand with their PORTABLE CHARGER – otherwise known as the JUICE BOOSTER 2



Jaguar Land Rover

Jaguar Land Rover Deutschland has already equipped several hundred service workshops and dealerships with the JUICE BOOSTER 2 and JUICE DIRECTOR 2.

Sustainability



Juice's aim is to ensure that every aspect of its business – from development through procurement to manufacture and end use – is as economical, eco-friendly and socially sustainable as possible.

Juice plants as many trees as needed to neutralise the ${\rm CO}_2$ emissions generated by manufacturing and transporting its products. The company collaborates with the international organisation One Tree Planted for this purpose.

Emissions for individual Juice products and trees planted

Product	CO2 emissions from production and transport	and this is how many trees Juice plants per product unit
JUICE BOOSTER 2	84 kg	1 tree
JUICE CHARGER me	102 kg	1 tree or, with pedestal, 2 trees
JUICE CHARGER 2	167 kg	2 trees, or 3 with a stand
JUICE TOWER 2	212 kg	3 trees
JUICE PHASER	101 kg	1 tree
JUICE DIRECTOR 2	280 kg	4 trees
JUICE ULTRA	850 – 1200 kg	between 8 and 12 trees

→ juice.world/engagement

Press release: Reforestation of the Chilcotin Plateau in British Columbia in western Canada

Press release: Reforestation efforts in the forests of Undabaso in Spain's Biscay province

The Swiss charging station producer has furthermore had its environmental management system reviewed to ISO 14001 standards by an independent authorised inspection agency, confirming that their production processes are environmentally friendly, but also acknowledging that this green approach is reflected across all levels of the company.

By signing up to ISO 20400, Juice is also demonstrating its commitment to working alongside suppliers who are equally committed to sustainable practices. Long-term partnerships guarantee product quality and ensure that all parties can plan with confidence.

Garnering "Activate 2021" awards for packaging management, and licenced to the requirements of the Waste of Electrical and Electronic Equipment Directive 2012/19/EU, Juice is also setting an example for packaging, recycling and waste separation.

This philosophy even extends to the product design phase. The smartJUICE load and charging management system certified to ISO 50001 standards guarantees users optimum energy management with maximum efficiency.

Certifications





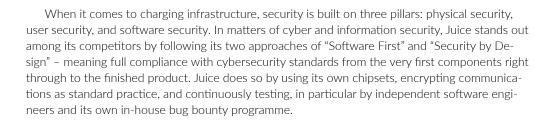






Cybersecurity:

The 3-level concept for comprehensive security



The company also focuses on continuously improving its internal security through suitable protective measures against external threats. By certifying its systems to the leading international standard for cybersecurity, ISO/IEC 27001, the company also sends a clear message externally about its in-house security efforts. This certification demonstrates that precautionary measures to ensure information security and data protection are firmly in place and regularly checked.

Software-driven development within the industry is transforming the entire market and calling for coordinated action moving forward. Juice is therefore pro-actively striving for establishment of a grid-wide standard for charging management, uniform billing and payment options (requiring, for example, payment by credit card) and implementation of the ISO 15118 standard protocol for "Plug and Charge" in which vehicles communicate independently with charging stations.



- Press release: Juice World Charging Day 2021
- Press release: Certification to ISO/IEC 27001
- → YouTube: Juice World Charging Day 2021
- → YouTube: Highlights of Juice World Charging Day 2021

Certifications





Interview with Christoph Erni



Based on your experience as founder and CEO of Juice Technology AG, what factors will bring about the decisive breakthrough for electric mobility?

One important lever for expanding electric mobility is a wide variety of available vehicle models. By 2022, over four hundred new models of all types of vehicles will be brought to market – everything from compact cars and mid-size and luxury-model saloons to SUVs and off-road vehicles. The range of choices between lots of new cars at affordable prices makes electric mobility accessible and attractive for all.

A better offering of vehicles also ensures higher sales figures which, in turn, increases demand for suitable charging opportunities. The sticking point is the need for an expansive, well structured public charging network. Yet, even more important is having fitting local charging infrastructure. After all, e-cars are mostly charged right where they sit parked for longer periods of time, meaning at home or at the workplace.

How can countries still lagging behind in the mobility transformation speed up change?

Joint efforts by all sectors are needed – both public and private: public policy-makers need to simplify the expansion of charging infrastructure by establishing sensible enabling frameworks, such as faster approval procedures. Municipal authorities and public-sector companies should lead by example and provide charging infrastructure in their parking facilities. Companies operating vehicle fleets can contribute by successively electrifying their vehicles. What's more, initiatives promoting multi-modal mobility are needed that, for example, expand and equip car parks at city boundaries to create transport interchange hubs with direct links to public transport grids. Such mobility chains allow travellers to arrange their journeys to their own customised needs and wishes. The Swiss car-sharing firm Mobility, for example, is pursing this vision with the help of Juice Technology by installing charging stations at major railway stations. The aim of this company's

efforts as part of changing over to a climate-neutral fleet is to electrify all 3,120 of its vehicles by the end of the decade, and to install over 300 charging stations by 2023.

What requirements are shaping the expansion of the charging network? Are AC solutions adequate, or should DC solutions be preferred?

With electric mobility really gathering speed now, it's more important than ever to rapidly expand electric charging infrastructure on a broad scale so that the transformation doesn't stall. The best solution is a good mix of AC and DC charging stations, and what specifically gets installed depends on the given location.

DC charging makes sense on long trips when e-drivers have to gain extensive range very quickly while under way. By contrast, AC charging helps to swiftly expand electric mobility: after all, for the cost of erecting one single DC charging station you can install about 20 AC charging stations. The less powerful AC charging stations also help prevent undesired degradation effects in vehicle battery packs.

Charging stations are needed everywhere e-driver stays tend to last a while: in the private sphere at home in the garage or carport, and in the public sphere at supermarkets, restaurants, fitness centres, golf courses and tennis clubs, hairdressers, doctors' practices and governmental offices, and of course at the workplace as well. AC charging technology is better suited for such locations because – in contrast to what is needed for DC fast chargers – their existing power feeder lines suffice for charger connection. Just one half hour plugged into a 22-kW

charging station is enough to tank up your vehicle for a range of an additional 50 km – the average distance driven in urban traffic on any given day.

Lack of a comprehensive, broad-scale charging network will ultimately slow the complete transition to electric mobility. How can portable charging stations accelerate the mobility transformation?

The crucial factor for ensuring further expansion of electric mobility is the availability of well functioning and easily accessible charging infrastructure. Portable charging stations such as the JUICE BOOSTER 2 contribute to better growth of electric mobility by helping to close gaps in the charging network while also offering high flexibility of use. Thanks to its comprehensive adapter system, our portable charging station can be connected to any conventional household or industrial power socket. This ensures that e-cars can be charged anywhere in the world. After all, electricity is available everywhere – and Juice's portable charging stations help make that power accessible. Whether used as a mounted wallbox unit at home, or portable charging station, or Type-2 charging cable at public charging stations: the JUICE BOOSTER 2 is the ideal 3-in-1 solution for safely and reliably charging electric vehicles anywhere at any time. Charging an electric car with our portable charging station should be as easy as charging a smartphone - and that's precisely what we've succeeded in achieving. Combining our JUICE BOOSTER 2 with the public charging infrastructure and the DC charging stations offered at transport interchange hubs creates a broad-scale all-encompassing charging network available worldwide. This is the only way to fully utilise the benefits of electric mobility.

While Juice Technology is the world's leading vendor of portable 22-kW charging stations, it also offers a complete charging product range, including fast-charging devices. What do you plan to invest in most in the coming years?

We will continue to produce high-quality hardware, and intensify our software orientation in particular. One important area of focus will be to develop software capable of executing charging operations fully automatically, so all that's left for the user to do is simply plug in the cable.

Software is key – not only to charging infrastructure, but to electric mobility in general. Our j+ pilot app bundles in one single tool all relevant information on the vehicle, driving behaviour, charging operations and energy consumption. This gives users access to a broad range of data displayed in neatly arranged, visually attractive graphical representations and visualisations. This easy means of monitoring vehicle power consumption and energy recovery through recuperative braking also incentivises more efficient and thus more environmentally friendly driving behaviour.

The app is being continually further developed and integrated into home energy management so that EV charging current can be drawn completely from a building photovoltaic solar power system or from electricity supply generated in real time from hydro power, as well as to enable control of charging stations and vehicle fleet management.

The idea to found Juice Technology came to you in 2014 when you couldn't find a fitting charging device for your

electric car. At that time it was all about the hardware. When did you recognise that software is actually the most important thing?

Hardware is the basic foundation that must function reliably in any situation. Our JUICE BOOSTER 2, for example, stands out compared to other charging stations because it's so ruggedly built that it continues functioning even if run over by a 42-tonne tank, as proven in testing. Yet, software is the real key to success, as periodic updates make it possible to upgrade charging stations, maintain their long-term usefulness and thereby make them future-proof. Sustainable mobility begins, namely, with sustainable infrastructure.

What makes electric mobility truly sustainable?

Electric cars are playing a key role in the development of sustainable, emissions-free mobility. This is why power generation from renewable energy sources needs to be increased, and it must be easy for end-customers to source this environmentally friendly electricity. It must be possible to charge green electricity, for example, from your own photovoltaic solar power system or from hydro power generated in real time. Smart control systems are needed for this to succeed – such as omni-dynamic charging and load management – that are integrated already in the charging process and simple to control, for example by a mobile application. Yet, sustainable mobility begins already in the charging infrastructure.

and establishing sustainable charging infrastructure starts early, in product design work. Where high-quality parts are used, such as proprietary components for the internals and aluminium instead of plastic for the housing, then the end-product, too, will be rugged and durable, and thus sustainable. Another element for ensuring high quality is software-based conceptual design that keeps products in pace with the state of the art through continuous software updates.

Still, like every industrially fabricated product, charging devices, too, have an ecological footprint. This is why efforts are needed to minimise this impact right from the very start. At Juice, we compensate for the grey energy consumed in production and transport of our products by planting trees. All told, in our name and with our financing we have ensured reforestation of an area equivalent to over 330 football fields of planted trees so far. Until recently we were active for this purpose in Canada, but have now shifted our commitment to a project in Spain. Irrespective of where we're currently active in this regard, however, it's important to us that the projects are of needs-based design such that no monoculture is cultivated, rather biological diversity is fostered to create contiguous, healthy, long-living and environmentally valuable forests. We take precisely the same approach to charging infrastructure: it takes broad-scale, dense coverage with a good mix of stationary and portable devices, DC and AC chargers, each optimally geared to the given needs and locations.



What topics can Juice help you learn more about?

- Mobile charging
- Private and public charging infrastructure
- General development of electric mobility
- General development of charging infrastructure
- Standardisation of charging devices
- Software solutions and apps
- Load management
- Smart home integration
- Electrification of vehicle fleets, fleet management
- Cybersecurity in charging infrastructure

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