EcoG Launches 2025 Edition of the Charging Reliability Index: Substantial Gaps Remain with No EV Platform Scoring Above 76/100 Points

Munich, September 2025 – EcoG published the second edition of the EcoG Charging Reliability Index (CRI), a benchmark study that evaluates how reliable electric vehicles (EV) charging interfaces are implemented and interact with CCS fast-charging infrastructure globally. Following the success of the first CRI report in 2023, the 2025 edition expands the scope by testing the following 10 global EV platforms:

- BMW UKL2
- Ford GE1
- Geely SEA
- Hyundai Motor Group E-GMP
- Lucid Air
- Mercedes MFA2
- SAIC LWB
- Stellantis CMP
- Tesla Model 3/Y
- VW MEB

and tracking key improvements in charging reliability, stability and user experience. EcoG added additional test categories to its evaluation and increased the number of tests by 50%, building on additional learnings from the field of the past two years.

Concerns about EV charging reliability are replacing range anxiety as one of the biggest hurdles for the adoption of electric mobility. Studies show that still 1 in 10 charging attempts fail. The implementation of the interface between the charging station and the electric vehicle (EV) is one of the crucial elements in the charging reliability as errors most likely cannot be resolved remotely when they occur. The tests detailed in this report result in the EcoG Charging Reliability Index (CRI) which shows that differences in the implementation of the EV charging interface on the vehicle side can result in a lower reliability of the charging start or in an unstable charging process - and hence result in a better or worse customer experience. The Charging Reliability Index presented by EcoG for the second time is based on 20 tests, which are categorized as Charging Initialization, Charging Process, Error Recovery and User Communication.

In addition, this time we in parallel tested the support of DC bidirectional charging. Overall 70% support what is needed for the V2G functionality, however none yet support the standard bidirectional charging interface based on ISO15118-20. WIth the IAA 2025 we expect the first announcement of EV platforms supporting bidirectional charging based on this standard.

Compared to 2023, the charging reliability of electric vehicles has shown overall improvements in existing test categories, however, in each category among the tested platforms there have been implementations resulting below 35% of passed tests and implementations exceeding 95%. Overall, no platform in total exceeded 76% in all 4 test categories. This shows that fundamental flaws still remain, which can cause substantial confusion and frustration among EV drivers and even breakdowns of EVs on the road. There is still substantial need for improvement to enable an acceptable user experience and mass adoption of electric vehicles.

In the following, we provide three exemplary findings:

Three findings from the 2025 CRI

1. Stability of charging process has improved: Higher control signal quality leads to fewer unwanted charging session interruptions

During the charging process, vehicles and charging stations constantly exchange information via communication signals transmitted via the charging cable (=" powerline communication"), for example about the possible maximum power the EV can accept depending on the current State of Charge. Weak or noisy Powerline Communication (PLC) between an electric vehicle (EV) and its charging station can cause sudden unwanted interruptions of an ongoing charging session, leaving drivers confused about the reason for the sudden stop and the charging incomplete.

In 2023, EcoG observed two cases where communication signals sent from the electric vehicles were so weak that charging sessions were at high risk of failure. In 2025, no such outliers were found anymore. This is a promising indicator for an improvement of robustness of EV implementations, leading to more stable and reliable charging sessions. However, with a difference greater than 20db between the best and worst implementation, the signal damping still varies significantly between the vehicle platforms.

2. A major source of failed charging session start is still not resolved: Authorization timeouts leading to cancellation of sessions before they actually start

One of the most common frustrations for EV drivers is when a charging session fails to start. In many cases, this is caused by too strict and misaligned timeouts between the car and the charger: To initiate a charging session, an EV driver plugs the charging cable into his car, initiating communication between the charger and the car. In the next step, the EV driver is asked to authorize the session, for example by swiping his credit card and entering a PIN code. This authorization process can take a certain amount of time. If it takes too long, the vehicle which is waiting for the session to start since the cable was plugged in, can run into a timeout and as a result cancels the charging session. As a result, even with a successful authorization of the charging session, the charging session will not start.

In the conducted tests for the 2025 Charging Reliability Index, 4 out of 10 vehicle platforms still imposed a very strict 60-seconds authorization window before cancelling the session - and causing frustration and confusion for EV drivers. What was a surprising observation was that with 6 platforms the timeout varies depending on the protocol version which is negotiated in the beginning of the charging process. Two platforms showed low timeouts only if ISO but not if DIN protocol is selected. This could be very confusing for the user, since it is not transparent which protocol is used.

3. Remaining risk of car breakdowns due to depleted 12V batteries: Risks from infinite retry loops

EV drivers can experience a colossal problem if the 12V battery of their car – the small but critical power source that runs the vehicle's control and safety systems – is depleted. As a result, the car is not reactive and cannot be turned on or into driving mode anymore without technical assistance. It has been seen often in the field that this happens if a charging attempt fails and the EV automatically retries to start the process for a long time.

While the implementation of such retries by the vehicle meant to improve convenience for EV drivers, EcoG found that three of the tested vehicle platforms repeated these attempts infinitely. This behavior places a heavy drain on the 12V battery. Overuse of the 12V battery not only reduces its lifespan but can also leave the car completely inoperable at the charging station.

Additional observations: Improvements and remaining problems

Beyond the main findings, EcoG identified several encouraging developments in EV charging reliability. Seven out of ten vehicles now support higher security levels in the communication (TLS = Transport Layer Security), strengthening the protection of sensitive control data during charging. Furthermore, all vehicle platforms tested ensured that cars cannot be moved while still connected to the charger – a basic but essential safety measure that helps prevent accidents and damage to chargers, cars and humans.

There are, however, areas where improvements are still needed. Five out of ten vehicle platforms do not verify voltage provided by the charger, relying only on information input provided by the charger, which could lead to physical stress of the charging components if communication is not precise or has a time delay. Only two vehicle platforms out of ten make use of standardized error codes to clearly communicate issues to the EV drivers like plug locking failures, leaving drivers without meaningful feedback when things go wrong.

The user experience also varies. Three out of ten vehicles do not provide a straightforward way to stop charging from the car itself (e.g. by clicking a button next to the inlet or in the HMI), forcing drivers to rely entirely on the charger's interface. And while most vehicles are improving

recovery after failed sessions, two models still lack support for key industry protocols such as ISO15118-2, limiting the interoperability.

Taken together, these results show steady progress across the industry but the best CRI value of 76% also highlights the importance of further improving charging interface implementations to achieve a reliable and user-friendly charging experience.

Conclusion

The 2025 Charging Reliability Index demonstrates that the EV industry is heading in the right direction: for instance higher control stability by less signal damping. However, persistent issues such as too strict authorization timeouts and vehicle breakdown risks continue to disrupt the EV driver experience significantly. These are frequently reported in user forums.

As EV adoption accelerates globally, the entire ecosystem – from automakers to charging operators – must work together to achieve reliable charging interface implementations.

At EcoG, we are committed to supporting this journey. By testing real-world EV and charging platform interactions, we provide insights that help car manufacturers improve performance ideally before their vehicles reach customers.

If you want to gain further insight into the test results, test EV platforms with us, get in touch – let’s make EV charging seamless, safe, and stress-free for every driver.

Press Contact EcoG:
Veronika Dickert, Senior Business Development Manager
veronika@ecog.io