

Thinking inside the box

AFIR-compliant ad hoc charging via NFC



The updated Alternative Fuels Infrastructure Regulation (AFIR) presents operators of public and semi-public charging stations with a new challenge: ad hoc charging must now also be possible without prior user registration. Enovates and Elatec show how “thinking inside the box” makes it possible to implement a solution without replacing hardware.

By Tobias Rasche

Six months – an extremely tight time frame when it comes to implementing a complex new legal regulation. But this was exactly the case with the Alternative Fuels Infrastructure Regulation, or AFIR for short, which has been in force since April 2024. A major challenge, especially for pioneers of e-mobility. The intention of European legislators is to use the regulation to accelerate the transition to sustainable e-mobility and to provide all road users with uncomplicated and safe access to the necessary charging infrastructure. An important prerequisite for this is what is known as ad hoc charging, i.e. the possibility for users to charge their vehicles spontaneously without needing to be registered or without needing a contractual commitment to a specific provider. The regulation stipulates that a secure ad hoc payment procedure must be integrated for charging stations with a charging capacity of less than 50 kW.

Operators of public or semi-public charging facilities such as supermarket chains, shopping centers, gas station networks or public parking garages face a complex task precisely due to this requirement. This is because with most existing charging stations, the payment process is handled via a separate infrastructure, such as prior registration with a service provider or the conclusion of a contract. However, it must now be possible to obtain price information and pay directly at the charging station without any major intermediate steps.

Dynamic QR codes – secure, but complex

Until now, static QR codes have often been used for the ad hoc payment procedure at charging stations. A simple sticker on the charging station is all that is needed.

Customers scan the code with their smartphone and are redirected to the online payment service. However, this solution is just as uncomplicated for fraudsters. All they have to do is paste fake codes over the stickers and direct customers to fraudulent payment pages. The scam is now so widespread that it already has its own name: quishing, a newly coined word made up of QR code and phishing.

The AFIR regulation therefore recommends using dynamic QR codes for the payment process. These are generated anew for each payment and are much more difficult to falsify. A digital display is required to show dynamic QR codes. While all charging stations put into operation from April 13, 2024 must have a function for secure ad hoc payment, there are many older charging stations that need to be retrofitted for this purpose. In particular,

providers who are pioneers in the area of e-mobility therefore face high costs for retrofitting or replacing their existing charging infrastructure.

Multifunctional RFID readers: a surprising replacement for displays

Elatec has found a clever, sustainable alternative for the Belgian mobility provider Enovates and its customers from business and the public sector. As an OEM provider, Enovates sells its solutions exclusively to companies (B2B) and the public sector (B2G). Since 2018, the company has been using RFID technology from Elatec for user authentication for its intelligent charging systems. Integrated RFID readers provide additional security and flexible access control. Thanks to this combination, users can easily authenticate themselves and operators can manage the billing precisely and ensure that the charging stations are only used by authorized persons. This improves both the overall user experience and operational efficiency. As a pioneer in the area of e-mobility with a broad installed base, Enovates and its customers are particularly affected by the AFIR requirements. The company was therefore looking for a cost-effective and resource-saving way to continue using the existing charging infrastructure, and found it in the modern RFID readers that were already integrated into the charging stations.

Like all Elatec readers, the reader used in the Enovates charging stations supports various radio and transponder technologies. This includes NFC, a standard wireless technology in smartphones.

In addition, Elatec customers can flexibly adapt the card readers to individual or new legal requirements using a software development kit. So the question was obvious:

Can the software be rewritten in such a way that the payment process is handled securely between the smartphone and the reader? Yes, is the answer that Elatec discovered in joint development work through innovative “thinking inside the box”.

Inside the (wall)box: ad hoc charging via NFC

The essence of the response was to update the firmware of the readers. These can now not only receive NFC signals, but also emulate an NFC tag themselves, i.e. digitally replicate a physical NFC tag. NFC tags can interact with smartphones and execute predefined commands as soon as the smartphone is in the vicinity of the tag. Using this emulated tag, the e-charging station can now communicate with a smartphone via NFC and trigger an action, such as opening a more secure payment website. When the customer holds their smartphone up to the charging station reader, a secure payment website opens on the smartphone display with the current charging prices and further instructions on the payment process. The payment itself is also processed directly via the secure website. For charging station operators, this is a convenient way to process payments, as access is possible with any NFC-enabled smartphone and users do not need a special app or a subscription for the charging station. It is also cost-saving and legally compliant, as it fulfills all AFIR requirements for ad hoc charging processes and price transparency, without having to retrofit

the charging stations with expensive LCDs. In addition, payment via NFC is more forgery-proof than payment via dynamic QR codes. As a result, Enovates’ charging stations now have secure and efficient user authentication as well as ad hoc payment at public charging stations as required by AFIR. The solution also scores highly in terms of sustainability, as the company can continue to use the existing infrastructure for a long time to come.

Fast and future-proof – firmware updates via remote maintenance

The legislator gave operators just six months to implement the AFIR regulation. Not only did the right idea have to be conceived and the new code for the firmware written during this time, but it also had to be ensured that the update could be delivered to all Enovates customers and their charging stations in a timely manner. This is another area where the new solution shows its strength: It takes neither time nor manpower to replace or retrofit charging stations on site. All you need to do is press a button. This is because Elatec’s RFID readers can be updated efficiently and quickly via remote maintenance. The new software is simply installed on the card readers at a specific time, just like an update on a PC. The Elatec development thus not only demonstrates an innovative path to AFIR compliance, but also represents a potential blueprint for adapting charging infrastructures to future technological or legal requirements



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