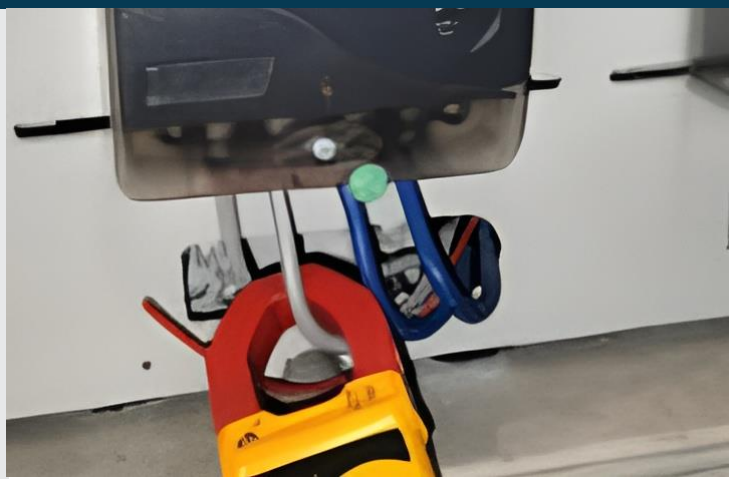
SUCCESS CASE 27.2024

Tamper Detection

USING SMART METER TAMPER DETECTION EVENT AND ALGORITHM TO PREDICT POSSIBLE FRAUDS



THE CHALLENGE

The use of an advanced metering infrastructure (AMI) architecture permits Distribution System Operators (DSO) to remotely access the smart meters avoiding on-site inspections.

The lifetime of the smart meter in Spain is 15 years, meaning that the DSO does not need to visit the smart meter during this lifetime, because all remote operations are possible. Therefore, the DSO should be capable of remotely detecting all possible kinds of fraud. At the same time, one of the open challenges in the deployment of AMI architecture is the achievement of clear benefits from the use of remote communications and monitoring.

THE SOLUTION

Smart meters are equipped with a functionality that allows recording events during which the meter cover is open, registering the date and time of opening and closure. These events are recorded even when the smart meter is turned off. This functionality in the meter is called *Tamper detection*.

Every day, i-DE reads all the recorded smart meter events. To delete possible “false” cases, a dedicated algorithm was added. This algorithm selects only the cases characterised by an event and a reduction of at least 25% in consumption in the week after the event generation. Additionally, the selection excludes customers affected by maintenance or any other work during the event’s detection period. For the selected cases, a request for field inspection is generated, to check for possible fraud and to recover non-invoiced energy.

MAIN ACHIEVEMENTS

Thanks to the presented system, **i-DE is capable of detecting and controlling fraud events.** A weekly report is generated, containing the most relevant information.

For more information about the project, please contact:
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For the year 2024, the collected information is reported in the following table.

	Número de OTs	Total Energia
Campaña	Total	Total
EVENTOS	626	802.053

	Tasa Exito CM	Energia / OT
Campaña	Total	Total
EVENTOS	34,19%	1.281

Of a total of 626 field inspections generated, the **success rate** (i.e. the rate of correctly identified frauds or poor connections) was **around 35%** with a total of **802 MWh recovered**, equal to an average of 1.2 MWh per inspection order.

During the first years of implementation of this solution, around the year 2013, inspection orders were generated in high numbers and the amount of recovered energy was consequently high. Nowadays, fraudulent customers are aware of this functionality and the majority of them refrain from fraud attempts.

KEY SUCCESS FACTORS

- To obtain great benefits, a key element is the **use of a very efficient Power Line Communication (PLC) standard protocol such as PRIME**. Every day, i-DE's meter data collector (MDC) reads the events connected to every secondary substation. This should be permitted by the communication protocol without interfering in the day-to-day business of the DSO (i.e., meter reading for billing and operation purposes).
- Interoperability is a must. **The use of common data protocols such as DLMS and technical specifications is fundamental**. For this reason, every installed meter incorporates the same DLMS profile and event implementation.
- The **collaboration of different DSO business departments** is also of great importance. For this use case, i-DE's AMI and Losses Departments have been working together to achieve the best results.

WAY FORWARD

From now on, through the **analysis of different fraud cases**, more events from the fraud group will be available to detect issues. Thanks to this, events could be programmed as "spontaneous", meaning that they are **automatically sent to the MDC** when they are occurring.

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