THE ELECTRICITY METER - MEASUREMENT SYSTEM OR MEASURING INSTRUMENT? VACATIO LEGIS

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ABSTRACT

The electricity meter installed in all household utilities is the instrument used to measure the electricity consumed by users. The energy consumed is displayed on the screen in each instrument. In addition to performing the measuring function it is also used for sending the power consumption data remotely, for the subsequent issuance of the energy bill. This latter function of the electricity meter (sending data remotely) creates many problems of both technical and legal nature as the consumption shown in the display are not considered in the process of setting energy bills. These problems affect public faith and the presence of estimated data in the bill is an indicator of unreliability of the billing system. The subject is dealt with the support of the decision of the supreme judges of the European High Court in a similar case and a solution to this legal vacuum is proposed.

INTRODUCTION

The electricity meter, as a measuring instrument of user's energy consumption, is located in a more complex metering system owned by the energy distributor, where the energy data is sent remotely. It is a simple data transmission system where a source (the electricity meter) sends the consumption data to the concentrator via the electrical power cables using P.L.C. (Power Line Communication) technology by overlaying the low voltage electricity, a higher frequency signal which is modulated by the information (the numbers of the display) to be transmitted. The latter sends them to the AMM central office and, after processing and validation, they are sent to the seller for subsequent billing.

To be clear, the block diagram is illustrated

The flow of energy consumption data

As shown in Figure 1, the meter consumption data, displayed on the screen, via a device integrated in the meter itself, travels from the meter to the concentrator for subsequent sending to the electricity control panel. The consumption data are subsequently validated by the distributor and transmitted to the seller for the creation of the energy bill that is delivered. It may happen that the consumption data does not reach the concentrator because of the interference in the electricity distribution network and you are forced to use estimated and not-real consumption data. This anomaly is a strong indicator of the inefficiency of the communication system.

The basis for calculating consumption

It is necessary to recall point 10.5 of Annex I to the LEGISLATIVE DECREE of 2 February 2007, n. 22 which, literally, reads “irrespective of whether it

is possible or not to read a measuring instrument at a distance intended for the measurement of services provided by utilities, it must, however, be equipped with a metrologically controlled display which is easily accessible to the consumer without any aid. The reading of this display is the result of the measurement which is the basis on which the price to be paid is calculated”. And again, Directive 2014/32/EU quotes, verbatim: “10. Indication of the result 10.1. The result shall be indicated by means of a display or a printed copy; The ratio is very simple: the user pays on the basis of the quantity displayed by the measuring instrument that must happen through an easily accessible viewer. According to these provisions, therefore, the user's consumption must be billing in accordance with the measures displayed on the screen (metrologically controlled) and not from data sent to the concentrator or in the measuring chain of the distributor.

The electricity meter

The electric energy is sold for an economic consideration quantified by a consumption measured and recorded by the meter owned by the distributor. For this reason, in the structure of the contract, the electricity meter assumes the function of instrument of measurement of electricity and of recording electricity consumption, accepted with the signing of the contract, which is supposed suitable. In particular, the ENEL counter has the following characteristics¹:

- Recording of continuous quantities (energy, power, voltage);
- Power registers;
- Voltage registers;
- Clock and calendars;
- Contractual events (activation, deactivation, transfer, changes to contractual parameters);

¹ [1] Fonte: università di bergamo <http://www.data.unibg.it/dati/corsi/20078/75602-6%20produzione%20e%20trasmissione.pdf>

Figure 2 - Measurement system (Measurement instrument + Transmission device).

- Voltage interruption;
- Other non-continuous voltage quality indices;
- Daily recording of continuous quantities and events;
- Tolerance in the power limiter;
- Remote control of the power magnetothermic;

Essentially, a bidirectional exchange of these data which are not CONTEMPLATED in the MID takes place with the distributor's control panel and, therefore, the meter cannot be considered an energy meter in the strict sense of the term.

The terms "Measurement system" and "Measuring instrument"

In order to clarify in an unambiguous way and to open up controversial scenarios that can be easily resolved, it is good to refer to the concepts below. The huge

difference in technical concepts between the Meter Measuring System (which must be MID) and ELECTRICITY MEASUREMENT SYSTEM realized with European Best Practices (not covered by MID and more correctly defined as MEASUREMENT CHAIN) is well illustrated in figure 3:

Therefore we define:

"Measurement instrument": any device or system with measuring functions (art. 4 c. 1 MID) and refers to the measuring instrument integrated in the meter;

"Transmission device": an electronic system whose function is to transmit data (reciprocally exchange information) with other devices connected remotely;

"Measurement system": there is NO definition in the MID (for energy meters) and there should be no misunderstanding of the use of the term as a system composed of a sequence of equipment, connected so that the measuring signal can be processed until the output reading is obtained, remotely, and realized by the distributor with the Best Practice EUROPE.

To avoid this ambiguity, therefore, we mean to:

"Measurement system" a set of a "measuring instrument" connected to a "transmission device", which does not perform measurement operations and does not influence the measurement itself. On this point the MID is very clear that is that any "measuring device" should not influence the "measuring instrument"² because, otherwise, it would affect the measurement remotely. This clarification is necessary to avoid ambiguity with the measuring system defined by the distributor, which is completely different from the above concept. It is more correct to define the measuring system of the distributor as a "chain of measurement".

Judgment «Vilniaus energija»

C 423/13 of 10 September 2014

Still today it is a huge unsolved problem legally regarding the basis of calculation to be taken into account for consumption and that is whether the data displayed by the display or the data transmitted and received remotely. Legal insurmountable problems

Figure 3 - Difference between system and measuring instrument.

² MID Directive 8.1. "The metrological characteristics of the measuring instrument shall not be unacceptably influenced by the connection of the measuring instrument to another device, any feature of the connected device or any remote device communicating with the measuring instrument"

arise with regard to the correct application of the MID Directive³.

To this end, the Supreme Judges of the European High Court addressed the above-mentioned problem in Case C 423/13 between a producer and a metrological body with regard to the reference for a preliminary ruling under Article 267 TFEU. The Supreme Judges have given their opinion as follows: Article 34 TFEU and Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments, must be interpreted as precluding national legislation and practice whereby a hot water meter, complying with all the requirements of that Directive, connected to a remote (telemetric) data transmission device is to be considered a measurement system and for this reason cannot be used in accordance with its intended purpose as long as, together with that device, has not been subjected to metrological verification as a measurement system” This sentence can be depicted and interpreted, as illustrated below.

Interpretation of the judgment

The meter made by the distributor is NOT a mere energy meter, but consists of a measuring instrument connected to an internal transmission device and as such, according to the Judges, after having excellently reasoned the judgment “cannot be used according to its destination as long as it is not subjected to metrological verification as a measurement system”. This is why the legislator has considered as the basis of calculation, recognized useful by the legislator for the billing of the consumption, exclusively the accounting of the consumption displayed from the screen of the meter, as an instrument of MID measures because “measuring instruments connected to remote (telemetric) data transmission devices may not be used in accordance with their intended purpose as long as, together with that device, have not been subjected to metrological verification as a measurement system”. This is also stated by the MISE Minister as a result of a specific parliamentary question⁴ where it is clear that “the reference data is only that displayed by the electric meter ensuring public faith”. The basis of calculation of the consumption indicated in the display of the meter, therefore, solves any problem that may arise in case of an incorrect communication in the process of sending data remotely, which is not regulated by the directive MID.

THE SOLUTION TO THE PROBLEM

The optimal solution to the problem, at no cost, is to allow remote access to consumption data to legitimate third parties. In this case:

- 1) to allow the user, without CAPTCHA blocks inside the distributor’s reserved area, easy consultation of their consumption data with an immediate feedback with the data of the screen, the only

Figure 4 - electricity meter as measuring system.

- consumption display, metrologically controlled, recognised by the legislator;
- 2) remotely send the data of consumption to the user electronically and before the process of issuing the invoice, thus reducing unnecessary litigation in court and allow the right contradictory;
- 3) to enable the Revenue Agency to control invoiced data more efficiently, without any access at present;
- 4) to bypass the legal void by guaranteeing the public faith⁵ cited and complained of by the supreme judges of the European High Court in the above-mentioned case, waiting to fill the regulatory void by the legislator.

DISCUSSION AND CONCLUSIONS

Discussions are argued “daily” in courtrooms: today the courts are clogged in civil litigation between distributor-user or between seller-user for INCORRECT MEASUREMENT, CONSUMPTION RECONSTRUCTION, METER MALFUNCTION, TECHNICAL FAULTS, and so on. and it is not easy for the Judges to decide because of intricate and complex rules to interpret.

The solution, from the legal point of view, is as follows: “the basis of calculation of energy consumption is established by the display of the meter” as previously addressed and will solve questions and problems such as:

- The means by which the energy consumption recorded and transmitted by the meter to the distributor, subsequently communicated and invoiced to the final customer by the seller, in analogy with the telephone bills, is the electric bill, “unilateral act of an accounting nature not dissimilar to the invoice”⁶ which constitutes “proof of the records reported if the user does not contest them”⁷;

³ [1] <http://www.labcert.it/pdf/DIRETTIVA%202014-32-EU%20%28MID%29%20-%20ITALIANO.pdf>

⁴ Act Camera - Question to answer in committee 5-01835 presented by TRAVERSI Roberto Wednesday, April 3, 2019, sitting n. 155

⁵ The citizen will have consciousness of the data

⁶ Cassation, Judgment No. 947/1986

⁷ Cassation, judgment No. 8901/1997

Figure 5 - Graphical interpretation of the judgment «Vilniaus energija» C 423/13 of 10 September 2014 It seems obvious, to argue the sentence from all points of view because of the very strong impact on the public good.

- "the invoice has no probative value"⁸ and "tests and checks" on meters are not a guarantee that it will work properly⁹ and "such certification cannot be considered an indisputable privilege"¹⁰

and therefore "the seller or service provider is responsible for photographic or tabular correspondence to the meter"¹¹

⁸ Cassation, Judgment No. 947 of 1986

⁹ Cassation, judgment No. 3686 of 1997

¹⁰ Cassation, judgment n. 170041 of 2002

¹¹ Cassation, judgment No. 3686 of 1997

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2. DIRETTIVA MID <http://www.labcert.it/pdf/DIRETTIVA%202014-32-EU%20%28MID%29%20-%20ITALIANO.pdf>