ANEC views on the research of the University of Twente on reading errors of static energy meters caused by conducted electromagnetic interference

Researchers from the University of Twente Enschede and the University of Applied Sciences Amsterdam found possible reading errors taken from electronic energy meters (or: smart meters) based on controlled laboratory experiments[1]. In several experiments, static meters were tested using Compact Fluorescent Lamps (energy-saving lamps), LED lamps and other equipment that generates electromagnetic interference. The tests on 3 phase meters revealed that some meters showed a deviation of registered energy of *267%*, which is a higher energy reading of *376%*, whereas other meters had a deviation of *minus 46%*, or decrease in energy reading to *minus 54%*. Further experiments with mains supply showed deviations of *582%* and *minus 30%*. The research concludes that the principal cause of interference appears to be the current sensor design.

The research raises the concern that potential electromagnetic interference may affect the accuracy of readings taken from smart meters. The study also notes that, in the past, consumers have complained about high energy bills after their energy meters were replaced.

ANEC is worried about these findings. The distortion of readings clearly poses the risk that some consumers with smart meters could be overcharged. This may also have consequences for consumer confidence in smart meters.

Although the Electromagnetic Compatibility (EMC) Directive 2014/30/EU[2] ensures electrical & electronic equipment does not create, or is affected by, electromagnetic disturbance, we fear the immunity standards supporting this legislation do not deal adequately with this relatively new type of equipment.

Our views on the ESMIG reaction to the study

In reaction to the findings, ESMIG, the European voice of smart energy solution providers, believes that the electromagnetic interference phenomena created in the tests grossly exceed emissions limits allowable under EU regulation for equipment typically used in households. They also believe these conditions would not be found in any imaginable normal household scenario[3].

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[1] Leferink, Frank, Cees Keyer, and Anton Melentjev. "Static Energy Meter Errors Caused By Conducted Electromagnetic Interference". *IEEE Electromagnetic Compatibility Magazine* 5.4 (2016): 49-55.

[2] Electromagnetic Compatibility (EMC) Directive 2014/30/EU

[3] ESMIG Position Paper, "Static energy meter errors caused by Electro Magnetic Interference", March 2017

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However, ANEC disagrees with ESMIG, as it is possible that a household could have 10 or more LED lamps connected to a dimmer. Although the emissions generated in the tests may be higher than normally found, such cases can occur. If such interference affects certified smart meters, it will ultimately be a problem for the utility companies and further reduce public confidence.

Action needed

As the smart meter roll-out is under way, we call for immediate action as it appears some meters do not meet the immunity requirements of the Electromagnetic Compatibility Directive 2014/30/EU.

In Europe, CENELEC TC 210 is responsible for co-ordinating EMC standards issues, including for smart meters and powerline communications. We therefore urge the CEN-CENELEC-ETSI Coordination Group on Smart Meters to request CENELEC TC 210 'Electromagnetic Compatibility' to check whether the existing immunity standards adequately cover smart metering systems and whether an amendment or a new standard dedicated to the new technology is needed. For meters using a radio interface, ETSI may need to investigate the adequacy of the existing standardisation framework.

We also call for further independent research on electromagnetic interference in domestic environments and metering. The inaccurate reading of energy consumption by smart meters is unacceptable to consumers. If further research confirms this, we believe affected consumers must be compensated and inaccurate meters replaced. With the increasing use of electric equipment appliances in the home, electromagnetic pollution will only increase in the future and may aggravate this situation.

ENDS.