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A New PLC-based Smart Metering Architecture for Medium/Low Voltage Grids: Feasibility and Experimental Characterization

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TITLE PAGE

PAPER TITLE:

A New PLC-based Smart Metering Architecture for Medium/Low Voltage Grids: Feasibility and Experimental Characterization

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ABSTRACT:

This paper investigates the feasibility of a smart metering architecture for modern power grids in the smart cities framework. A particular focus is made on Automatic Meter Reading, with the aim of facing some costs and safety drawbacks of current solutions (such as dependence from wireless communication providers, reliability problems in bad weather conditions, and exposition to cyber-attacks). The proposed architecture exploits power line communications (PLC) at both low and medium voltage level, thanks to new devices and an innovative medium voltage PLC coupling system. The new coupling solution and the whole smart metering architecture are experimentally verified in a wide frequency range, from CENELEC A band up to 200 kHz, by using different modulation techniques; the on-field measurement campaign has been carried out on the distribution network of Favignana Island (Mediterranean Sea). Success rate and RTT measured in real environment confirm the feasibility of the proposed solution.

HIGHLIGHTS

- A PLC-based architecture is proposed for smart metering in distribution grids
- A new medium voltage PLC coupler is used, which has been patented by authors
- On-field experimental tests are made in the distribution grid of Favignana Island

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