DSP Based Technology and Calibration Limits the Uncertainty at Transformer Lossmeasurements

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Abstract

In a Smart Grid many different Renewable Energy Sources are connected to each other via the main grid.What they often have in common is a huge coil in series with the current, either to suppress the higher frequency harmonics or to adapt via the secondary of a transformer to the common shared voltage. As they form a continuous loss day in day out for many years it is very important to measure this loss with high precision not only at load but also at no load condition. A power measurement of a 6MW generator, with a measurement uncertainty of 0.01%, results in a ± 0.6kW uncertainty value for the measured loss. At no load conditions the Power Factor will become as low as 0.01 making the measurement a real challenge. A power meter based on DSP (Digital Signal Processing) in combination with a high precision calibration offers a good solution.