

ICT scalability and replicability analysis for smart grids: methodology and application

G. López López; J. Matanza Domingo; N. Rodríguez Pérez

Abstract-

The essential role of Information and Communication Technologies (ICT) in modern electricity grids makes it necessary to consider them when evaluating the scalability and replicability capabilities of smart grid systems. This paper proposes a novel step-by-step methodology to quantitatively perform an ICT scalability and replicability analysis (SRA) in a smart grid context. The methodology is validated and exemplified by applying it to two real case studies that are demonstrated in the EU-funded RESPONSE project and comprise solutions relying on different communication technologies. The results of the proposed methodology are summarised through ICT scalability and replicability maps, which are introduced in this paper as a quick way of obtaining an overview of the scalability and replicability capabilities of an ICT system and as an efficient way of estimating the feasibility of scenarios not covered in the SRA.

Index Terms- smart grid; scalability; replicability; information and communication technologies; ICT; SGAM

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