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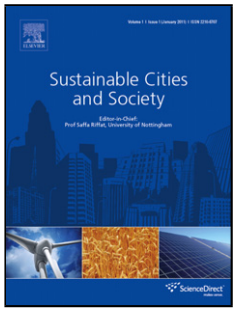

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Grid Emulator For Small Scale Distributed Energy Generation Laboratory

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Highlights

- *Design and implementation aspects of a grid emulator dedicated to test small scale distributed energy generation are proposed.*
- *Developed grid fault emulator can generate common grid faults and line impedance variation.*
- *An algorithm to generate line impedance is presented and supported with simulation and experimental results.*
- *System stability is ensured for proposed control parameters variation by analyzing closed loop poles.*

Abstract

This paper presents the design of a grid emulator dedicated to test small scale distributed energy generation. laboratory The proposed emulator aims to test its performances under different power quality conditions considering grid codes and standards. The developed emulator can generate common grid faults and line impedance variations. This last point is an additional feature versus common grid emulators. The paper discusses design and implementation aspects. Emulator performance analysis are investigated under special operating conditions. Simulation results are carried out to illustrate theoretical developments and a set of experimental results are provided to demonstrate the effectiveness of the proposed emulator.

***Keywords*-Grid emulator, line impedance emulation, equipment under test, distributed energy generation.**

1. Introduction

Climate change and aspiration for less pollution, better environment and social progress have promoted clean energy sources. Indeed, the growing interest in design of future sustainable societies leads to an energy landscape with an increasing use of