I. Introduction

Recently, in an effort to optimize the electric power generation process, electric power systems have been evolving into more intelligent and autonomous smart-grid and smart micro-grid systems. Using Information and Communication Technologies (ICT), these systems have been able to introduce computational and communication components in all aspects of power generation, distribution and consumption. These ICT components interact with conventional electric components leading to the increase in complexity of electric power systems. In addition, the complexity of the smart-grid has been exacerbated by the penetration of distributed renewable energy and the implementation of advanced features such as loadshedding and dynamic pricing.

In order to a study, analyze and optimize smart micro-grids there is a need of effective simulation tools. These tools should allow the operator, for instance, to quickly assess the impact of a new communication technology on the performance of the grid, determine the effect of weather on control algorithms, or perform fault analyses.

Recently, a number of simulation tools for smart microgrids have been proposed. Most of these tools focus on the control aspects of power systems. However, there are general purpose simulation tools that can be used form smart microgrids. These tools are based on different simulation approaches and methodologies. There is a need to assess the strengths and weaknesses of these tools with respect to the implementation process, accuracy of the model, and output for the final result. This will help to determine the best tool for the job which in turn will lead to more accurate study and analysis of these complex systems.

In this paper, we study popular smart micro-grid and general purpose simulators by using them to implement a simplified model of a Photovoltaic (PV) panel for a smart micro-grid. We go through the step by step process of implementing the model in each tool. Through this practical approach, we determine the ease of the implementation process. We also run and observe the output of the simulation process in order to determine the accuracy of the result.