Abstract

With the advancement achieved in renewable energy resources, the concept of a centralized power generation is being replaced by a more distributed power generation. The management of this distributed power generation is significant, the standard power grids are being replaced by the Smart Grids. These new smart grids system have two way communication of electricity and information between the generation units and the consumers. The main interest in the topic of smart grids for the current research is the simulation of these grid with the implementation of model reduction. Model order reduction is critical for such kinds of simulation where the size of the problem is very large and is computationally expensive.

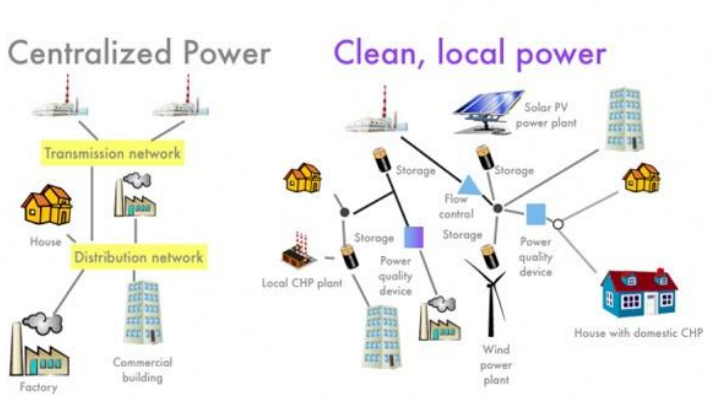

Figure 1: Traditional grid vs Smart Grid

In literature review, Proper Orthogonal Decomposition (POD) was studied for the model reduction of the smart grids. Hence, it serves as the starting point for the current study. POD has some advantages but in the current research it has limited application as it is a posteriori method.

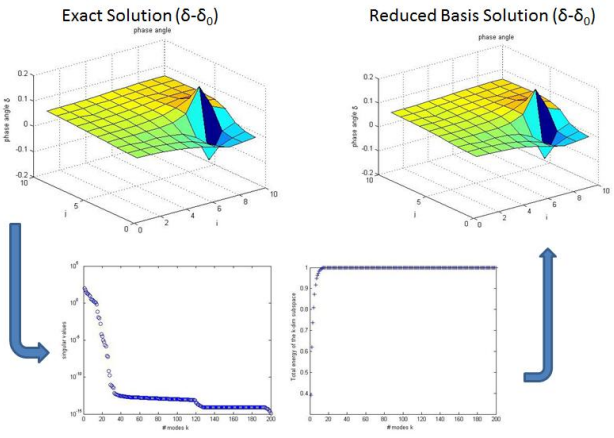

Figure 2: POD model reduction for a 10 by 10 grid

In the next step of the current research, LATIN (Large Time Increment) method is used along with the PGD (Proper Generalized Decomposition).