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Agent Based Power Market Management.

Abstract

The smart grid is a vision of a grid with the abilities of integrating renewable energy resources in the grid, energy storage, enabling markets, self-healing, greater reliability, efficiency, improved power quality, etc.

The aim of this project is to design an intelligent power management system that can provide greater access to the market place for the consumers and integrating Distributed Energy Resources (DER) in the main grid to improve reliability and reduce energy cost. The grid has to be controlled and monitored by intelligent agents ,witch are intelligent entities placed in some environments to make wise decisions and act flexibly and autonomously based on their built-in intelligence along with their previous experiences.

This project has focused on the applications of these intelligent entities in a grid to achieve the envisioned goal of a smart grid.

Keywords: Smart Grids, Agent, Distributed Energy Resources (DER), Renewable Energy Resources, Energy market place.

Introduction

Electricity along with its grid is the most significant engineering achievements of last the century which influenced human life the most. Electricity is playing an important role in our lives. Electrification has made us so dependent on it that each small appliance in our use, transportation, communication and business activities etc are indebted to it. Power grid is considered as the largest interconnected network on our planet, it is composed of large number of generation units, long transmission lines and much more; making it one of the complex systems.The demand of electricity has exponentially increased for last few decades, so compelling the existing power grid to be upgraded accordingly. But the more viable solution is to introduce the concept of distributed generation in the smart grid to compensate somehow increased demand without increasing the capacity. In this way most of the loads can act like prosumers and would be able to reduce burden on the main grid. Our motivation is to make the existing power grid as intelligent as to accommodate all generation options and consumer friendly to increase consumer's participation in electricity market which is the ultimate goal of the smart grid.

Power grid is appeared to be the most complex system, so controlling it by the implementation of distributed processing is the best suitable option to manage it more efficiently and in a short time especially in emergency states. In contrast to centralized processing, distributed process is more flexible, efficient, reliable and economical.

In this project our task is to focus on these distributed intelligent entities which can act effectively and autonomously to achieve the overall goal of the system. Intelligent agents are the most suitable entities implied in this regard in the smart grid to have all the envisioned features of smart grid into reality. This is the real motivation to study and implement these agents into smart grids.

Architecture

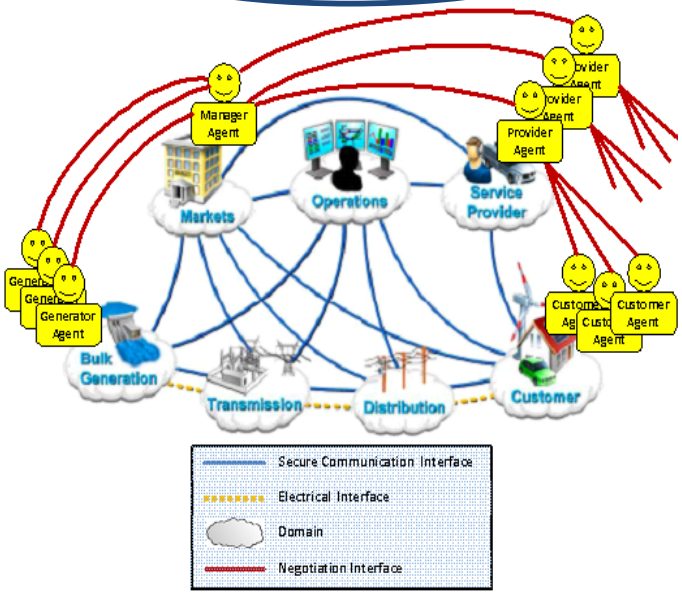

Figure : Agent Based Smart Grid Management.

Conclusion

The structure of energy market is going through major changes as a result of progressive liberalization and decentralization. The introduction of a smart grid concept has resulted in modernization of a traditional power grid, enabling usage of intelligent software agents as representatives of trading entities on such modernized energy market.

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