

Computing for Human Services

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Electrical and Computer Engineering-IIUM University

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Chapter 38

Smart Grid Communication Layer

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38.1. Introduction

A smart grid is an emerging trend of managing electricity network that uses advanced digital and ICT technologies to monitor and manage the transport of electricity from all various generators to meet the varying electricity demands of end-users. Therefore, smart grid involves various types of layers including application layer, communication layer, control layer, and power system layer. This chapter discusses about the communication layer of smart grid. This chapter is organized into three parts: the first part introduces several definitions of smart grid the second part describes the typical building blocks of smart grid, so that we know the position and importance of communication layer in the smart grid design. In the last part, we discuss the communication layer, includes the technologies and standards for the communication layer.

38.2. Smart Grid Definition

A smart grid is an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end-users. Smart grids co-ordinate the needs and capabilities of all generators, grid operators, end-users to operate all parts of the system as efficiently as possible, minimizing costs and environmental impacts while maximizing system reliability, resilience and stability. Smart grids are evolving set of technologies that will be deployed at different rates in a variety of settings around the world.

Smart grid technologies offer ways not just to meet these challenges but also to develop a energy supply that is more energy efficient, more affordable and more sustainable. Characteristics of smart grids are enables informed participation by customers, accommodates all generation and storage options, enables new products, services and markets, provides the power quality for the range of needs, optimists asset utilization and operating efficiency and provides resiliency to disturbances, attacks and natural disasters.