

## ABSTRACT

In India energy and peak shortages are in the tune of 8.5% and 10.3% respectively during the year 2010-11. More than 67% of electricity is generated from thermal power plants. The over dependence on thermal power plants base electricity generation also raises serious concern in climate change related issues. In order to meet the growing demand for electricity, it becomes a necessity rather than option to find new non-carbon base energy resources and use the present's resources efficiently. The Smart Grid is characterised by a two way flow of electricity and information and capable of monitoring load supply and demand from power plants to end users on real time basis. Smart Grid has the capabilities to enable a new era of electricity generation, transmission, distribution and consumption driven by efficiency, reliability and flexibility. In the Smart Grid with the integration of advanced computing and communication technology is expected to greatly enhance the efficiency and reliability of future power system with renewable energy resources, as well as distributed intelligence and demand response. In this project detail work related to establishment of a Smart Micro Grid at Solar Energy Centre (SEC) has been carried out. This is first of its kind project which integrates the conventional energy sources as well as renewable energy sources through a centralized controller to manage not only generation but also demand through wireless communication technology in India. The purpose of developing the Smart Grid project at SEC campus is to demonstrate the smart use of electricity by integrating renewable power to the grid, support for energy saving and maximisation of cost benefit performance. The project carries the actual implementation of Smart Micro Grid in the SEC campus along with techno-commercial analysis. The real time monitoring of generation from renewable energy sources and real time consumption for demand side management (DSM) has been carried out. It has been observed through monitoring of the renewable energy generation resources, that there is an improvement of energy generation through immediate attention to the faults. It has been found that through continuous monitoring of the PV plant, there has been an average increase in energy generation in the order of 30% in a day. The smart management does not only save energy but also manages to utilise the renewable energy at a maximum level and helps in better load management at the end users point.