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A REVIEW ON SMART GRID POWER GENERATION THROUGH RENEWABLE RESOURCES

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Abstract - This paper presents a short view on grid Integration and power quality associated with the integration of renewable energy sources systems in to grid and Role of power electronic devices and Flexible AC Transmission Systems related to these Issues. In this project, recent trends in power electronics for the integration of wind and solar power generators are presented. Discussion about common and future trends in solar and wind energy systems based on reliability and maturity of each technology are presented. Application of various techniques as applied to mitigate the different Power Quality problems is also presented for consideration. Power Electronics interface not only plays a very important role in efficient integration of Wind and Solar energy system but also to its effects on the power-generation system operation especially where the renewable energy source take an special place of the total system capacity.

However there are various issues related to grid integration of RES keeping in the view of predicated trends it becomes necessary to investigate the possible solutions for these issues.

Keywords: **Renewable Energy System, MSEB Power,**

Power Load, Change over Switch, Controlling Unit.

1. INTRODUCTION

Renewable energy resources are going to become alternative for future energy needs. India is a country of different size and this is helpful in balancing the variable output of renewable energy sources located in some states by integrating them into all India grids. Government of India targeting to achieve 20000 MW grid interactive powers through solar and 38500 MW from wind by 2022. Wind energy and Solar energy, are considered to be the main attributes of renewable energy for electricity generation, and are growing at faster rate for the last two-three decades. Renewable generation from wind and solar has increased substantially during last few years and forms a significance proportion of the total generation in the grid.

Three main factors are impacting the future electric systems of the world; government policies, efficiency need of the consumer, and the introduction of new intelligent computer and hardware technologies. Environmental concern have created the governmental policies around the world, including at the federal and state levels, which on flow the entire energy system to efficiency, conservation, and renewable sources of electricity . These factors are the main drivers that are expanding the use of all sorts of new renewable energy and storage technologies on one hand and new energy efficiency and conservation techniques on the other hand. Smart grid technology is enabling the effective management and distribution of renewable energy sources such as solar, wind, and hydrogen. The smart grid connects a variety of distributed energy resource assets to the power grid. By leveraging the Internet of Things (IoT) to collect data on the smart grid, utilities are able to quickly detect and resolve service issues through continuous self-assessments. Because utilities no longer have to depend on customers to report outages, this self-healing capability is vital component of the smart grid.

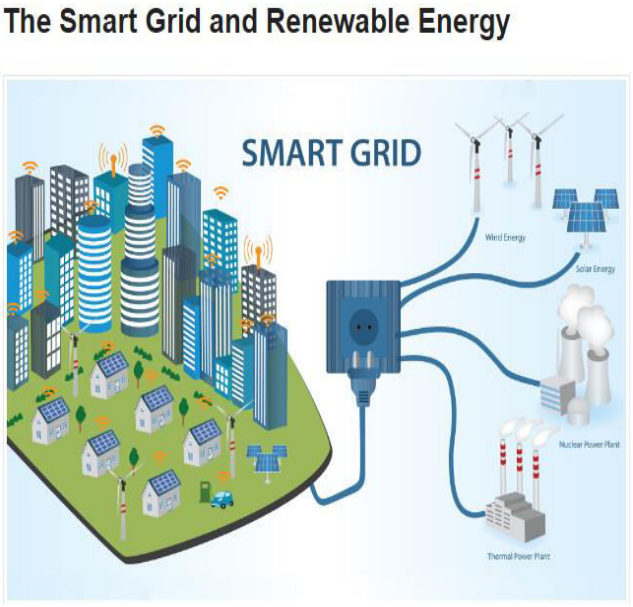

Figure-1) The Smart Grid and Renewable Energy

Consumers are becoming more proactive and are being empowered to engage in the energy consumption decisions affecting their day-to-day lives. At the same time, they are expanding their energy needs. Example are consumer participation will ultimately include extensive use of electric vehicles (both cars and trucks), remote control of in-home appliances to promote energy conservation, ownership of distributed generation from ever more renewable energy sources, and management of electricity storage to locally match supply to that demand.

The availability of new technologies such as more aware about SCADA sensors, secure 2-way communications,

integrated data management, and intelligent, autonomous controllers has open up opportunities that did not exist even a decade.

2. Literature Review

H. Gharavi and R. Ghafurian[1] says that "A smart grid (SG), also called next generation power grid, is generally defined as the aggregation of emerging technologies, hardware, software and practice that make the existing infrastructure of power grid more reliable, accommodating, secure, resilient and ultimately more beneficial for consumers".

A. Thomas[2] says that "In conventional power grid a large number of customers are generally fed from a few central generators while in the smart grid bi-directional transfer of power and information occurs that makes the delivery network distributed and automated. The recent development in the power system allows the seamless integration of alternate form of energy production sources into the existing power grid".

X.P. Zhang [3] said that "However, the alternating and discrete characteristics of these sources is the major barrier in integration to the smart grids that can be handled by the deployment and effective use of
control modes. This not only cause the improvement in performance but also the operational hours of these sources will be increased".

The most exploited renewable energy sources are hydel energy, wind and photovoltaic source. The share of the renewable energy production to global electricity demand is increasing continuously and it was about 20% at the end of 2011. However, these sources vary in requirements for their abstract in main streamline. Issues such as the efficiency, reliability and security in power
system forces the operators to exploit widely distributed renewable energy sources and deploy them rapidly into grid. These sources are helpful to environment and also to human health due to less pollution generated. Risk associated with others plants such as disruptions in fuel supply due to international conflicts, problems in transportation and unavailability of unit can also be overcome by the onsite small scale renewable generations. Renewable energy resources can be used for
power generation as isolated system but their benefits are significantly enhanced when they are integrated into electric utility system. With greater use of smart grid enabling technologies, higher degrees and rates of penetration can be accommodated. Integration of variable natural renewable energy resources require a huge modification in existing network operation which may in due time lead to increase in electricity cost. In ref. U. Helman said that [4] "problems are mentioned related to intermittent nature of RER" and "these problems are clearly demonstrated in ref. [5] said by S. Kiliccote". Cameron W. Potter [6] also describes "the variation aspect of RERs in the integrated power system that is named as daily, monthly and yearly variability. For the ability and stability of modern grid, the understanding of this variability is vital".

3. Proposed System

In this project we generate electricity through different renewable resources such as wind and solar power. The working of the system is such that when the MSEB Power is off the power load automatically switched on the Solar Power or on the Wind Power. For that automatically switching of Power Load we use Change over Switch Circuit. In this project we also use the snubber circuit for the performance enhancement of the system. A snubber is a circuit that is used in semiconductor devices for protection and performance enhancements. They have many different purposes, namely the reduction of power dissipation in power electronic switching networks.

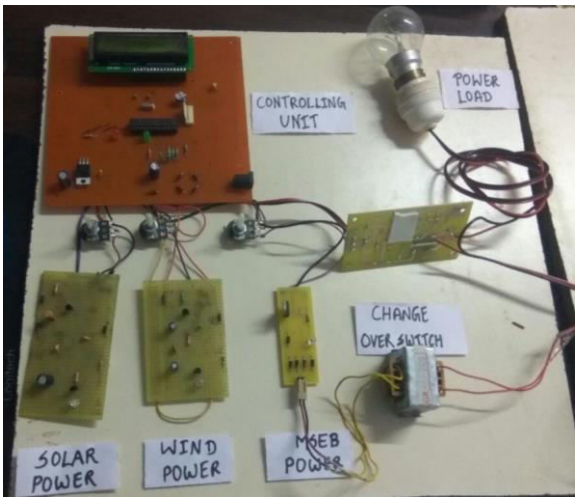

Figure-1) Proposed System

A snubber circuit limits or stops (snubs) switching voltage amplitude and its rate of rise, therefore reducing power dissipation. In its simplest form, a snubber circuit basically consists of a resistor and capacitor connected across the thyristor. They are capable of doing many things, including:

- Reducing or eliminating voltage and/or current spikes.
- Limiting dI/dt or dV/dt .
- Shaping the load line to keep it within the safe operating area.
- Reducing total switching losses.
- Reducing EMI by damping voltage; and
- Transferring power dissipation from the switch to a resistor (or a useful load).

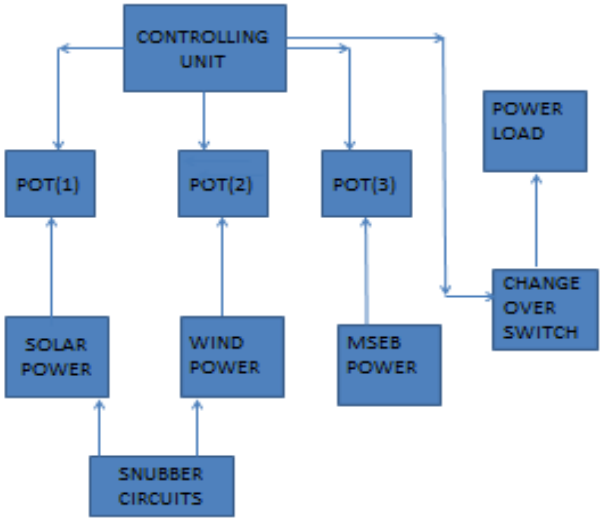

Figure-1) Proposed System Flow Chart

4. CONCLUSIONS

Smart grid technology is an extended form of analog technology that has also been introduced for controlling the use of appliances by employing two-way communication. However, the prevalence of Internet access in most homes has made the smart grid more practically reliable to implement. Smart grid devices transmit information in such a way that enables ordinary users, operators and automated devices to quickly respond to changes in smart grid condition systems.

5. ACKNOWLEDGEMENT

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