

# A Review on Smart Grid System to Monitor and Control Renewable Energy Source

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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, late patterns in power gadgets for the coordination of wind and sunlight based power generators are introduced. Conversation about normal and future patterns in sunlight based and wind energy frameworks in view of unwavering quality and development of every innovation are introduced. Application of different methods as applied to relieve the unique Power Quality issues is likewise introduced for thought. Power Electronics interface not just plays a vital job in proficient coordination of Wind and Solar energy framework yet in addition to its impacts on the power-age framework activity particularly where the sustainable power source assume a unique position of the all out framework limit.

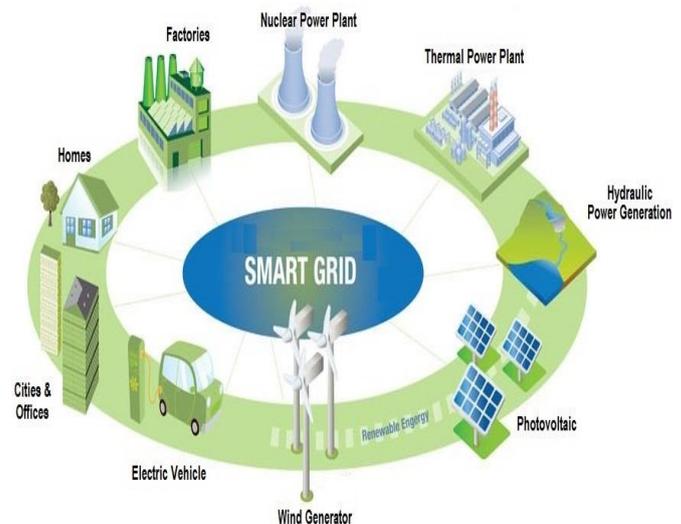
**Key Words:** Solar, wind, Renewable Energy System, MSEP Power, Power Load, Change over Switch, Controlling Unit.

## 1. INTRODUCTION

It is a high level metering innovation including setting astute meters to peruse, interaction and input the information to clients. It estimates energy utilization, from a distance changes the stock to clients and remotely controls the most extreme power utilization. Brilliant metering framework utilizes the high level metering foundation framework innovation for better execution. These are equipped for conveying in the two bearings. They can send the information to the utilities like energy utilization, boundary values, cautions, and so forth and furthermore can get data from utilities, for example, programmed meter understanding framework, reconnect/disengage guidelines, overhauling of meter programming's and other significant messages. These meters diminish the need to visit while taking or perusing month to month bill. Modems are utilized in these savvy meters to work with correspondence frameworks, for example, phone, remote, fiber link, power line interchanges. One more benefit of savvy metering is finished a version of altering of energy meter where there is extent of involving power in an unlawful manner.

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.



For example, sunlight based, wind, and hydrogen. The savvy lattice interfaces an assortment of dispersed energy asset resources for the power network. By utilizing the Internet of Things (IoT) to gather information on the shrewd matrix, utilities can rapidly distinguish what's more, resolve administration issues through consistent self assessments. Since utilities never again need to rely upon clients to report blackouts, this self-recuperating ability is essential part of the brilliant lattice. Buyers are turning out to be more proactive and are being enabled to participate in the energy utilization choices influencing their everyday lives. Simultaneously, they are growing their energy needs. Model are shopper interest will at last incorporate broad utilization of electric vehicles (the two vehicles and trucks), controller of in-home apparatuses to advance energy protection, responsibility for conveyed age from always sustainable power sources, and the board of power stockpiling to locally match supply to that interest.

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”.

Manageable power sources moreover called green power sources consolidate the breeze, hydro, sun situated, biomass, ocean and streaming energy sources. These resources have a promising future on account of their present situation pleasant nature and wide availability.

In ref. [16] a scheme for demand side management is proposed. It allows customers in proactively controlling their very demands. It also allows load shifting from peak loads to low demands. It is also proposed how to utilize available energy by using EVs. The results indicate the potential of the scheme to achieve energy savings and release capacity to accommodate renewable energy and electrical vehicle technologies.

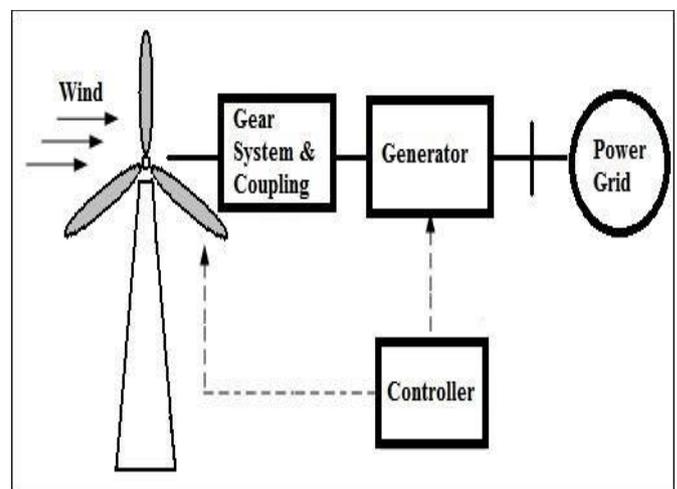
The paper at ref. [17] presents a general overview of present power electronics technologies to be used in renewable energy resources for integration in smart grid. A network of

this type is essential in order to deploy electric vehicles. These are applicable where utility companies and consumers are working together to attain sustainable energy consumption, by increased use of renewable energy sources, bringing generation closer to customers and making a commitment to rational and efficient consumption.

In ref. [18] an energy management system (EMS) is suggested to optimize operation of smart grid. It behaves as a sort of aggregator of distributed energy resources allowing the SG to participate in the open market. Integration of demand side management (DSM) and active management schemes (AMS) gives a better exploitation of renewable energy sources. The effectiveness of the proposed EMS was verified on a 23-bus 11-kV distribution network. Results proved that the combined operations of RES and Price Responsive Demand mitigate network constraints while satisfying higher demand levels and reducing the energy costs.

### 2.1 Wind Power

Wind energy is considered as one of the most strong and potential substitute energy resource due to its boundless and clean nature. The engine energy of wind is changed over into mechanical energy with the help of wind turbine that is related with the rotor edges. The rotor is further coupled to the generator (by and large doubly dealt with acknowledgment generator) for the change of mechanical energy into electrical energy. The power got from the breeze turbine at express region generally depends on the breeze speed, at tower height and turbine speed ascribes.

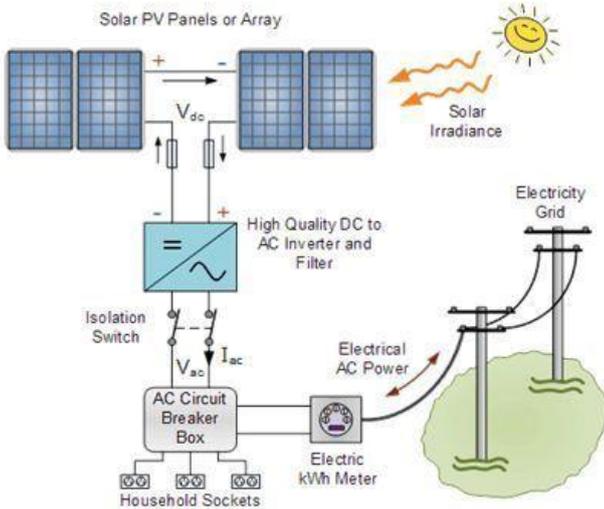


Total capability of turbine and generator notwithstanding the way that having no risky effect and power creation at sensible cost from wind energy there are similarly certain disadvantages, for instance, weakness of openness, uncontrolled power yield, etc Because of its haphazardness and stochastic lead, probability based showing systems are required and its ideal task can be looked out by the usage of groundbreaking estimations.

### 2.2 Solar Power

Daylight based energy is for the most part coursed over the area and it might be handled by the use of different genuinely propelling advances for instance sun fueled warm power, Solar photovoltaic (PV) that are requested in light of their instrument of getting the sun fueled

radiations and its change into electrical energy. Sun situated thermal power plant is an indirect methodology for moving sun controlled energy into electrical energy, in which thermal power is made by collecting the sunlight radiations also, a while later steam is made that drives the turbine generator as in the event of customary nuclear energy plants.



The photovoltaic power plant, primary type of sun powered energy, is an immediate technique for changing over the sun powered radiations into power. Photodiodes are utilized in these plants for the effective assimilation of daylight. This entire framework is for the most part created of battery powered battery, regulator, inverters, load bank and so on PV power plants can be utilized as independent wellspring of energy and it can likewise be associated with primary power lattice.

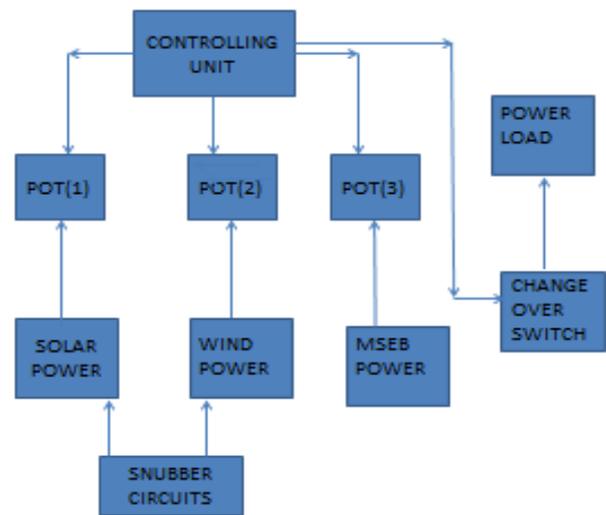
### 3. Proposed System

In this project we produce power through various sustainable assets like breeze and sun oriented power. The working of the framework is with the end goal that when the MSEB Power is off the power load consequently turned on the Solar Power or on the Wind Power. For that naturally exchanging of Power Load we use Change over Switch Circuit. In this project we likewise utilize the snubber circuit for the presentation improvement of the framework. A snubber is a circuit that is utilized in semiconductor gadgets for insurance and execution upgrades. They have various purposes, to be specific the decrease of force dissemination in power electronic exchanging networks.

A snubber circuit cutoff points or stops exchanging voltage abundance and its pace of rise, hence lessening power dispersal. In its least complex structure, a snubber circuit essentially comprises of a resistor and capacitor associated across the thyristor. They can do numerous 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).



### 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. Appropriate execution, dependability, solidness of force being consumed and created should be guaranteed. Accordingly it is important to gauge, test and break down the power utilization to each part of force framework for its presentation and conduct, under typical as well as outrageous working circumstances.

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