EVOLUTION OF SMART GRID TECHNOLOGY

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ABSTRACT:

The developing population and the huge increase in domestic products had became a greater increase in the requirement of electricity. The most critical situation that consumes more economical issues for maintenance to the nation is ELECTRIC GRID. These critical situation can be avoided by the scheme of smart grid . The modern advancement in information and communication technology has evolved the growth of smart grid technology. The foundation like communication and monitoring plays a vital role in grid . The main key of this paper is to provide the research work in the fields of wireless communication , power grid communication, photovoltaic cell and smart grid. The two main infrastructure in smart grid
is communication and sensing the infrastructure. Through this architecture the future smart grid will provide multiple path for flow of electricity .

Keywords: smart grid, power grid, transmitter and distributer(T&D),monitoring

1.INTRODUCTION:

The three dominant factors are impacting the future electric system of the world :1) government policy 2)efficiency need of the consumer 3)introduction of new intelligent computer and hardware system. The 1st existing power grid system was installed in 1886. This system has been faced numerous challenges like senescent of equipment , cultural value and outmoded engineering. This in return will reduce the accuracy of these power grid. Apart from this accuracy issues the total yearly money spent for these power grid is very high. To solve these issues smart grid technology has been made an appearance as advancement in the electronic technology. Smart grid means the automation of existing power grid by improving its efficiency, reliability and sustainability. Apart from these issues the carbon emission causes a major effect in environment. Smart grid is the next generation power grid which helps to all the part of the nation. The smart grid performs the following tasks such as generating end to consumer end ,accuracy and online information.
These tasks can be achieved by following field like information technology, communication technology and electric grid. The part of information technology is to hold the databases of the entire systems like generation, demand and consumption. Inspite of storing the data in the database , the cloud storage is more easier to access. The information technology will gather information from the electric grid through monitoring system. The electric grids are being maintained ,monitored and even recognize by wired communication. By using the wired system it will result in huge loss of economy and many economical impact. This wired system is more costlier than any other infrastructure. But smart grid technology will maximize the use of renewable energy resource and reduce the need of electricity and emission of co_2 in atmosphere. WSN(Wireless Sensor Network) has three substations namely sensing substation, processing substation and transceiver substation. These substations are implemented in smart grid . WSN cloud will be an ideal progress for smart grid application which consist of the following applications ,like computing, storing, and networking. So , this paper summarizes the part of information and communication technology(ICT) in smart grid through renewable energy resource.

2.LITERATURE SURVEY:

[1]RABAB HASSAN , GHADIR RADMAN-SURVEY ON SMART GRID: Creation of
smart grid provides utility and their customers significance improvement in power service. The smart

grid has attracted researches from different perspective. One can see variety of problem and challenges in the field of smart grid. **[2]**emerging new technology like distributed generation , distributed storage, demand side load management will change the ways we consume and produce energy. This technique enable the possibility to reduce the green house effects and improves the grid stability by optimizing energy stream **[3]**electricity network operator must operate their network with the high degree of efficiency and reliability. Presently the driver for low carbon electricity generation technologies are high and to accommodate such technologies in significant changes have to be made that T & D network are defined and operated **[4]** the static slow changing power transmission and distribution market is finding itself the telecommunication and information technology market driving necessary change and innovation in support of 21st century intelligent utility network called smart grid **[5]**the technical composition of smart grid expounded and development process and the present research status of the smart grid home and abroad as well as the practical significance of developing smart grid are introduced. The smart grid technologies are building of the realization of self healing function as well as distributed power generation technologies

3.OVERVIEW:

Smart grid are going to be ensuing generation power system. This combines info technology, integrated communication technology , sensing instrumentality, automation for increasing the dependability , potency and permits by directional flow of electricity and knowledge. Still existing electrical grid served for the state for several years however realize it becomes less economical thanks to transmission and distribution losses to beat these losses we'd like a random replacement and modernised existing grid by sanctionative watching options it is achieved by advanced good grid.

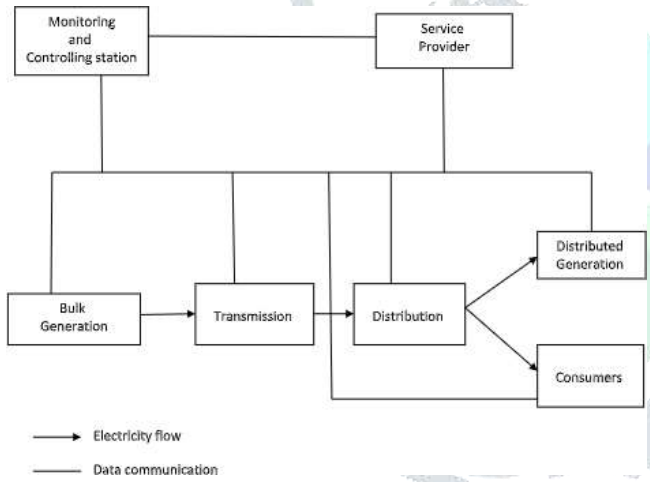

Fig.1:FRAMEWORK OF SMART GRID

The flow chart (fig.1) explains however the framework is premeditated in good grid. good grid isn't just for watching the electrical grid however additionally for make sure the clean energy because the population and technology increasing speedily therefore the pollution and property technology additionally increase. To fulfill the matter with power eviction, info line within the existing grid became necessary a number of the key edges of good grid are: real time interaction of client, distributed generation and storage ,reliability, quality of service, prevention from attack and power check, sanctionative market ,economical.

4. ARCHITECTURAL DIAGRAM:

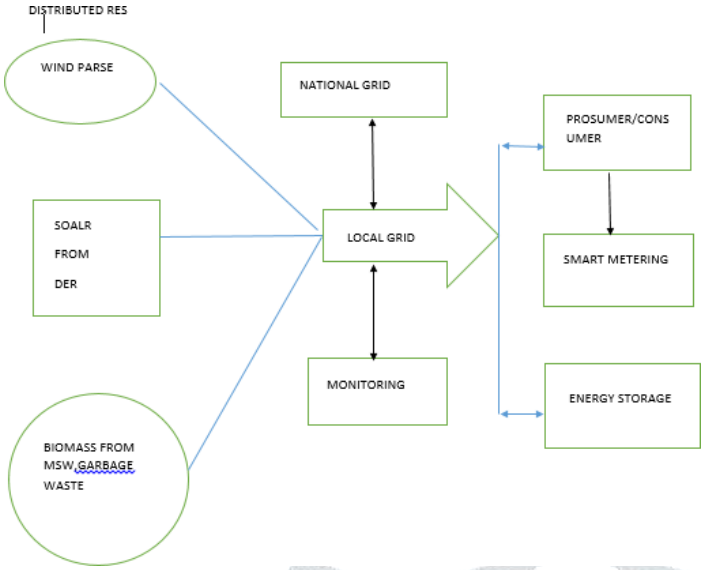

Fig.2.1: DISTRIBUTED RES

From the figure(fig.2.1),we analyse the renewable energy source(wind farm, solar panel, biomass) are connected to a local grid by monitoring device and distribute the electricity to consumer and energy storage which was analysed by smart metering system.

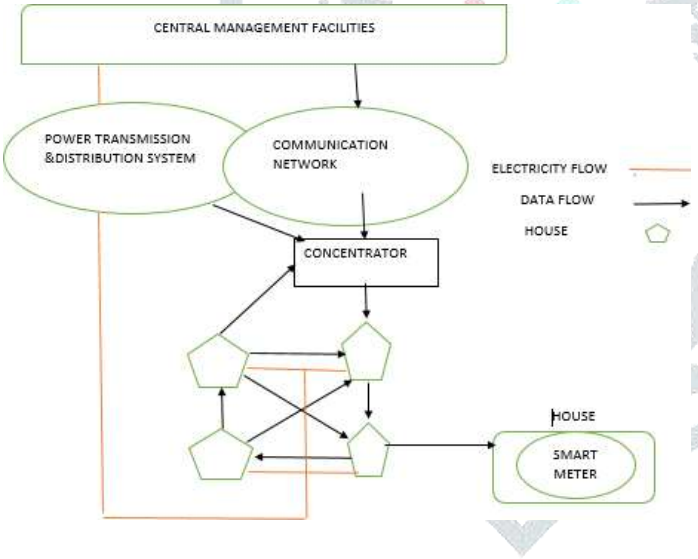

Fig.2.2: SMART GRID TWO WAY COMMUNICATION

From the figure (fig.2.2), the central management facility distribute the power transmission and the communication network through the mediator(concentrator)and divides the electric flow and the data flow through two way communication. In this smart grid , a smart meter is set up to analyse the amount of current used by the devices. This process is done when the renewable energy is not connected with smart grid

5. EXISTING SYSTEM:

The adopted technology in India is Transmission and Distribution (T&D) of electricity through power grid, a communication which drives electricity from an electric generator to a user who is in need of electricity through wires. In the 19 th century, alternate current was 16.5 kWh and it extended to 1383.5 tWh by December 2020. This efficiency is not enough for growing population in India. The fast growing will stretch upto 900 GWh. Non renewable resources like coal, petroleum, etc are not sufficient for future needs. Instead of using non renewable resources, renewable resources are the best for future needs. The new technology has changed the size of infrastructure which need no change but the system that controls, sensors and other small equipments has to be added in the existing technology. India does not have enough

power to meet its needs. Communication capacity, 1.93 billion units are being wasted.

Hence, power draining is the high issue than power propagation in India. The peak hours are 2.3% in the noth side and in the south part is 26% short at the important hours. The state like Chhattisgarh has a lot of resource where power generation is not enough. The 13 th year plan summed in 400 MW capacity installed in 2020. The drawback of power draining has been solved due to this. Other than draining, there are many problems like stealing of power, connection requirement and the losses of communication. For the existing power grid, smart grid is the best option. As smart grid is cost effective and developing India in the domestic product. India is a developing country that suffers a lot of T&D losses. The problems in electric grid can be solved in smart grid. Wireless communication is the best way for the problems in wired communication.

6. PROPOSED SYSTEM:

The current mode of transmission and distribution of electricity had proved to the unreliable and inefficient. This is because the electricity demand in our country is reaches to the maximum. The researches are know experimenting the electricity with the smart grid technology. To overcome the issues faced in demand. This smart grid can help to reduce the green house gas by up to 211 million metric ton which is more reliable than the electric grid. This is what the investors spend their money in this new technology. In this figure(fig.3), the smart grid is not applicable for household uses alone it can also take part in all the field i.e, industry, agriculture, medical, etc…

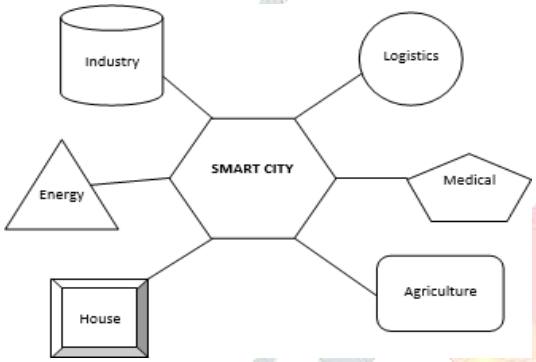

Fig.3: FUTURE OF SMART GRID

By 2025 the industry is expected to have a valuation of $500 million. To overcome these issues such as green house emission and electricity demand, the renewable energy resource and power grid are connected in two way connection. Since the smart grid is connected via sensor (wireless) these sensors are connected in both source and the destination. The wireless electricity is going to revolutionize the whole world

7. INFORMATION AND COMMUNICATION TECHNOLOGY:

ICT is one of the technique for IT that gives the idea for work of unified transmission and mix of telecom and machine,also enterprise S/W, storage and video,rechange information as needed.the technique ICT is handled to analize about the visual and telecom with CN via connection system.there are more financial incentives that merge the mobile system with computer network. With a unified system of connecting,giving out signal and administration.ICT is an system that as transmission tool, TV,mobile,PC and H/W network etc. as a different services like video broadcasting and far of learning. When retaining electric grid and integrating transmission merged to complete a smart grid.The ain of smart grid is to provide a good transmission infrastructure.The transmission system in the smart grid moves to any of the three substation-voltic grid,maintanance station,and service supplier.The procedure of connected element are preserved and automatically cheked in the middle generator and renewable energy generator through transmission media.The smart grid is the two way communication.Side manager and balanced structure are the major task of smart grid. They are fullfilled by a good ICT structure as been incorparated.The ICT will not stop here, it will provide a bigger power by using ICT the financial cost reduces.

8. ROLE:

Smart grid uses two way communication for data flow(Information and checking).Sources show the key most nature of electric type and giving out system in india.Gungor et al sates that ICT will play the important role in smart grid permanently.

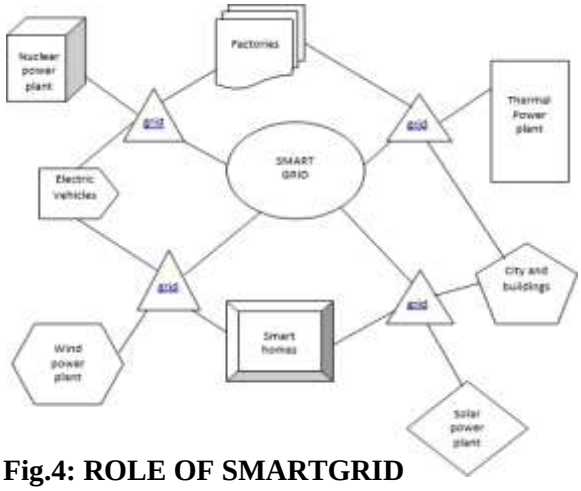

Fig.4: ROLE OF SMARTGRID

The Role of smart grid (fig4) shoes the smart grid features which are connected.ICT is feasible in grid that as high power,flexibility and decreased carbon discharge are mostly done by the challenges in thetransmission technology.The characteristics include protection,quality of service,verificatioon,responsible and usefull,guarenty. The smart grid networks can be home space network(HAN,Wide Area Network,Neighbourhood Area Network,Native Area Network).These to be supported with applications as automatic metering infrastructure(AMI) was generation of T&D losses and management of smart grid.

9.COMMUNICATION MEDIA:

ICT merges the telecom and PC for information transfer.As said about,HAN,WAN,NAN and LAN can be connected with wire or wireless.In the wired media,the failure is predictable when there is a disater and structure as to be maintained carefully. These of link is wireless when compared to wired.when the wired network is used,it as high financial expenditure,but has high speed of data transfer.In wireless network,the equipments like GSM,3G,GPRS etc.. holds the application like demand respond and AMI.Zigbee uses less consumption of power,less complexity and is easy to use.The smart grid structure helps to stand steady during disaster and phone transmission. The answer for wired power grid problem are achieved in woireless smart grid.

10.AIM OF SMART GRID:

Main aim in the usage of smart grid is to make a effective living for the people who live on Earth. The transition of resources should be less cost, as the people can use it is effective manner. The performance of the smart grid is being tracked, will be used to generate smart grid in any country of the world. These documentations can be used to improve the existing one. The improvement of each level in smart grid is to make terra byte need less for the next generation.

It is predictable that when smart grid is used, when the electric system's capacity factor will improve even though, there is a high increase of population and demand. The existing power grid is reused by adding an extra solar panel and other sensors for getting electricity during day and night time. Using smart grid, the operational and maintenance cost is reduced. As a citizen, it is our duty to use smart grid to reduce cost and pollution, to fulfill the demands. Tracking metrics is important to check whether the expected outcomes are recognized by the people.

To make the smart grid successful the users should recognize the savings and benefits due to this. The build blocks used to build the smart grid must be of less cost. The educational universities must teach the students about the values of the smart grid, and the generation of new jobs for electrical engineers and computer science engineers. The new technique must be taken as the smart grid will become a good source of electricity after few years.

11.RESEARCH TOPIC ON SMART GRID:

The researchers are researching more on smart grid technology as it is main domain of electricity for present and future use. The study on smart grid technology must be done in 2 areas: The primary part is Transmission part and the secondary part is the grid made of electricity. In transmission part honesty, possibility, usage of resources should be maximum, flexibility, and safety have to be developed.

Advancement in accessibility of components can be attained, only when the transmission technology that

gives a maximum level of safety and flexibility for the networks with heterogeneous property.

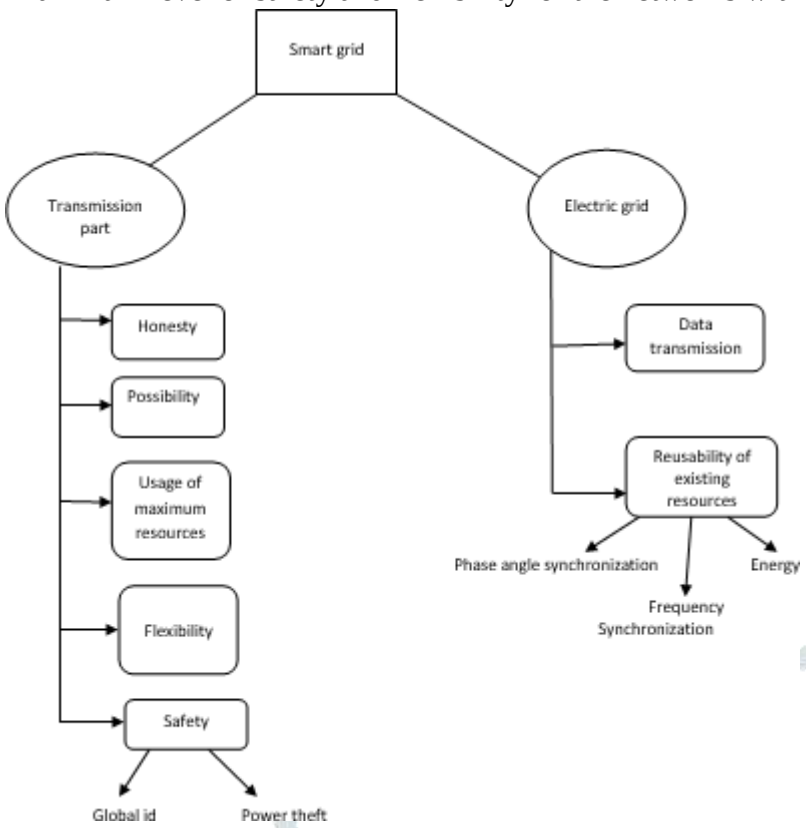

Fig.5 KEY OF SMART GRID

This figure(fig.5)denotes some of the research based smart grid the In this type, the mesh will be including various components for transmission and other operations. The voltaic grid

has to communicate in other platforms, for data transmission, which has to be looked after. In the network, reusable energy has to scanned for phase synchronization, frequency synchronization and energy. Safety issues like stealing of energy, global id for online metering via transmission medium has to be evolved. Test bed evolution for knowing the metrics like availability, flexibility, etc are the main topic to be experimented.

12.CONCLUSION:

Smart grid is the greatest of all for supplying electricity all through india. It is one of the main topic for the researches to improve the lifestyle of the people in india in low cost.in this paper we gave some details on the status of electric grid to turn it into smart grid. We also gave some details that's why smart grid is important for the life of citizen in india. The conclusion is "creating new things on smart grid are the major elements for improving the standard of living". Advance metering Infrastructure are under development process for getting higher accuracy. This is the major topic for the future generation to run more electronics on less cost and renewable energy

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