Smart Grid Technology Applied on The Existing Grid

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Abstract- *The energy demand increase day by day but increase in generation take time and due to generation by non- renewable sources very bad impact on the environment and resources are limited so to fulfil energy demand need to decrease loss and use the energy in efficient way. So smart grid technology applying in power system. In smart grid use smart device like to compensate reactive power use control compensate device for example TCR,TSC,STATCOM etc. In smart grid use two way communication system. In smart grid use static relay to detect fault efficiently and reliably. Use sensor to utilize electricity in smart way.*

Keywords- control compensative device, microprocessor based static relay

I. INTRODUCTION

Smart grid technology use to electricity in efficient ,reliable, to improve power quality. The power is major factor to consume electricity because we know that if power quality not as standard range then our device may be damage and if the power factor is poor then line current high so loss in transmission line increases. Due to inductive effect of line power stability limit low mean power delivered to the load is less . And when long transmission line on no load or light load the receiving end voltage is higher than sending end voltage this effect due shunt capacitance effect between line and ground this effect called Ferranti effect. Means inductor absorb reactive power and capacitor generate reactive power so reactive power compensation is required. And it is done by FACTS device which improve power quality and compensate reactive power as per requirement and also delivered more power . In smart grid use power line communication techniques for two way communication system. Use of microprocessor based static relay to increase response .

II. USE OF COMPENSATE DEVICE

To transmission of electricity 30% losses are considered which are very high so to fulfil energy demand it compulsory to compensate these transmission loss . And many loss are occur due to reactive power and these reactive power company are by series and shunt capacitors bank and reactor but the value of these device is fix so reactive power is not compensate as requirement

.Use to compensate reactive Power by FACTS controller like SVC,TCSC, STATCOM,SSSC etc.

USE STATIC AND MICROPROCESSOR BASED PROTECTIVE RELAY

There are many type of fault are occur in the power system so protection of different zone is required but in traditional system we are use only electromagnetic type of relay which have low response and low sensitivity and high burden on CT and PT So this very dangerous for power system. So use of static and microprocessor based relay which are very fast response and low burden on CT and PT , absence of mechanical inertia, long life and less maintenance .

Microprocessor based relays are latest developments in this area

. In this type of relay use VLSI technology. The advantages of microprocessor based relay over static relay with or a very limited range of applications, are attractive flexibility due to their programmable approach. These relays provide protection at low cost and complete with conventional relay. These relays have very large application in modern complex power network.

USE POWER LINE TWO-WAY COMMUNICATION SYSTEM FOR SMART GRID

Power line communication is communication over power line so in which not involve any installation or extra maintenance because use power line . In which a high frequency(100KHz 300MHz) carrier signal is injected into line by coupling device. In existing grid consumer products is not able to communicate directly to the grid but in the smart grid use two way communication system so customer know that what is the cost of electricity at any instant and other information.

Use PWM techniques for inverter

DC supply is generated by solar panels and wind turbine and energy store in battery is converter in AC by inverter. But due use of 180°and 120° mode harmonics generate so power quality decrease so to reduce these harmonics content use

PWM techniques and by PWM we can control voltage level very fine

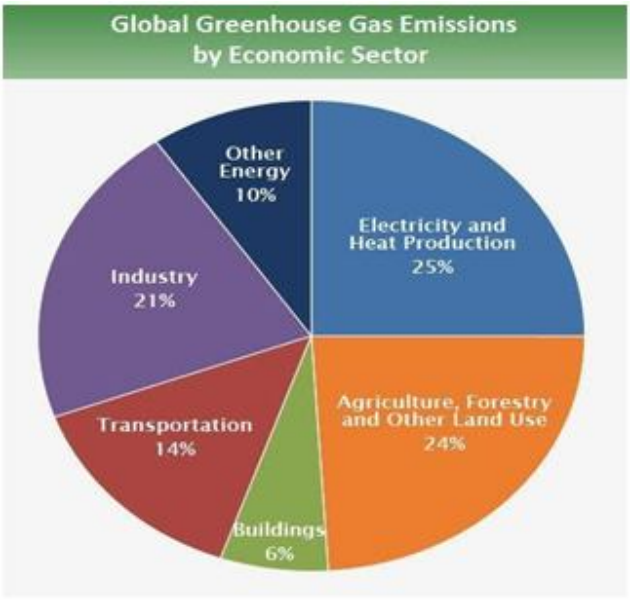
Utilizes electricity in smart way

We can save electricity by using smart device and utilities of electricity in smart way for example in India mostly we can see that road lights are glow before the darkness and the intensity of light lamp are same in day and night so we solve these problem by using lights depends resistor.

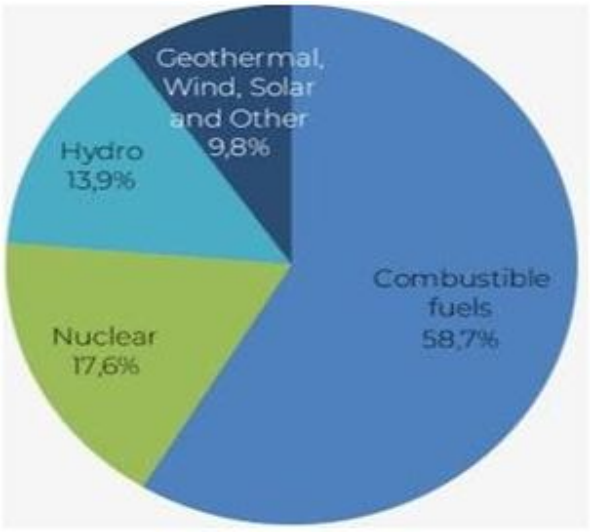
Consume electricity in smart way for example we charge battery of electrical vehicle and start some additional load like washing machine, water pump when cost of electricity is low .

Distribution side generation

We know that electricity utilization is pollution free but due to electricity and heat production 25% of greenhouse gases emissions and this amount is very large so generation of electricity is not pollution free.



This is because about 60% electricity generation is due to combustion of fossil fuels. These fuels emitting large amount of greenhouse gas. And these fuels are present in limited amount



The pollution is reduce by generate electricity using renewable energy sources for example solar, wind etc. Consumer can also generate electricity by solar and wind hybrid system at distribution side and consumer can also fed power to the grid ifgeneration is more than its requirement. So cost of electricity is reduce.

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