Application of Distributed Energy System Techniques

Rohit Chawla[1], Dr. D.K.Chauhan[2]
[1, 2] Noida International University Noida

Abstract- *India is one of the larest economy across the world .Energy is the most important need of the country. Demand of energy is increasing day by day. A lot of problem occurs due electricity shortage, power quality problem, distribution losses. Due to increase in prices the need of alternatives of high quality and reliability are required. In this paper author proposes the concept of distributed enery system for India.*

I. INTRODUCTION

India is among the fastest growing country in the world .For enhancing the growth a huge amount of electricity is required. Today most of power consumtion dependent on Non renewable sources of energy. They are ending source of enery. So from now we have to conserve non renewable sources and to increase the use of renewable energy which is endless. Distributed generation is the need of time . Distributed generation is small-scale electric power generators that produce electricity at a site close to customers or that are tied to an electric distribution system. The range is typically in range of 5KW to 50KW. Distributed generators include solar photovoltaic, wind turbine, fuel cell, gas turbine but are not limited to synchronous generators, induction generators, reciprocating engines, microturbines (combustion turbines that run on high-energy fossil fuels such as oil, propane, natural gas, gasoline or diesel),

These units are located nearer to end users. They are also called on site units because electricity is generated on user site rather than far away sites. In distributed generation we have to collect energy from many sources and distribute.

Due to on site production of electricity is reduces the

- Cost
- Complexity
- Interdependencies
- Inefficiency with the transmission system.
- improve power quality
- reduce power losses
- improve security of supply.

In past days diesel generators were used for the distributed generation due to reliability. But these days solar is most popular in distributed generation system. In distributed generation system the main priority of the system is the host where it is generated and the balanced is send it to the grid.

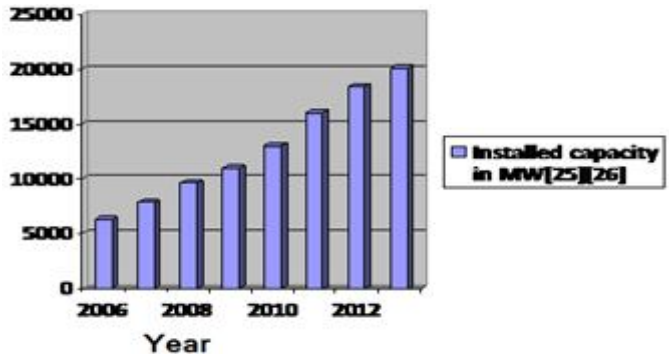
II. DISTRIBUTED GENERATION TYPES

1. Solar Energy

Solar energy is one of most important source of energy. PV cells are used for using solar energy. It is a method of producing power by converting sun energy into D.C. electricity by using semiconductors made up of Silicon and Germanium. It does not have any moving part. It is also called as clean sustainable technology. Wind and Solar photovoltaic is the third most important renewable energy source in terms of globally installed capacity after Hydro. Nearly one hundred countries are using solar PV across the world. Germany remains the world's largest producer of solar energy, contributing almost 6% to its national electricity demands. India is using solar power for water pumping, house Holds, Street Lighting, emergency light.

2. Wind power

Wind energy is also a source of renewable energy .It is the change of wind energy into a useful form of energy, by using wind turbines to produce energy . It, is also the alternative to non renewable energy and uses little land. It is renewable and widely distributed, clean product and no greenhouse effect emissions during operation it is being adapted by 83 countries across the world . Denmark is the country which is generating more than a quarter of its electricity from wind. Its production is increasing very steadily more than 25% in a year In 2010 wind energy production was over 2.5% of total worldwide. In India Wind power accounts for 6% of total installed power capacity and it contributes 1.6% of the country's power. the Indian Government has set a target of adding 11 GW is from Wind Energy in its 12th Five Year Plan (2012-2017).



Wind installation Capacity

3. Microturbines

It is also an alternate source of energy .These are small electric turbines that use gaseous and liquid fuels for the rotation of turbines. These turbines are connected to the generator and produces electricity. They run at very high speed to generate power. Due to high power and high speed they also produce heat. The electricity produced by microturbines are cheap and clean due to use of renewable source of energy.

4. Fuel Cell

The other source of energy is fuel cell .It is a device that basically converts chemical energy into electricity through a chemical reaction with oxygen. Fuel cell uses Hydrogen as a fuel and oxygen from the air for the production of electricity. It is very clean and efficient and reliable source of energy. They main use of fuel cell is in hybrid vehicle . Fuel cell is also used in aeronatics, space ships and satellites.

5. UPS System

These are known as uninterruptible power supply. These act as a uninterruptible power source, UPS or battery/flywheel backup. These are generally an electrical apparatus that provides emergency power to a load when the failure in main supply. these are different from other emergency system as they provides instantaneous protection from input power supply interruptions. It support with the help of energy stored in batteries. The runtime of UPS is not too high but sufficient to protect a equipment and to properly shut down.

The main general categories of modern UPS systems are

Advantages of Distributed Generation

- It is reliable system.
- There is no need of making new wiring like transmission or distributed lines.
- These are cheaper
- Easy to install and maintain.
- Dependency on one source is decreased.
- It Repalces the normal power if it fails.

Application for Society

- Customers can generate electricity and can sell to the grid also
- It increase the life standard due the to extra income to the family
- It reduces the amount of electricity purchased during peak periods due to onsite generation of electricity.
- It meets the continuous power need of the residential markets.
- It works as a backup power when the problem in grid failure system.

III. CONCLUSION

Distributed generated system can solve the country energy problem. It increases the efficiency of the system. It also decrease the dependency on the non-renewable energy sources. A lot of benefits are from the distributed generation system as it reduce the peak load demand and need of heavy and costly distributed lines. It also adds the extra power to the grid and increase the grid efficiency. It also reduces the air pollution as due to the use of renewable energy source. If the pollution will be less the public health will be good.

REFERENCES

[1] India to unveil 20GW solar target under climate plan Reuters, 28 July 2009

[2] "Welspun Energy commissions largest solar project". Economic Times(Jaipur, India). 2013-03-12.

[3] "Tata Power commissions 25 MW solar project in Gujarat". Economic Times(New Delhi, India). 15 February 2012.
Surendranagar Solar Farm

[4] "Gujarat flips switch on Asia’s largest solar field, leading India’s renewable energy ambitions". Washington Post (New Delhi, India). 19 April 2012.

[5] "Adani Group commissions largest solar power project". Economic Times(New Delhi, India). 5 January 2102.

[6] "Moser Baer commissions 30-MW solar farm in Gujarat". The Hindu(Ahmedabad, India). 12 October 2011.
Jaishankar, C. (23 December 2010).

[7] "Solar farm launched in Sivaganga district". The Hindu (Chennai, India).

[8] "Karnataka gets India's first 3 MW solar plant". Deccan Herald (Kolar, India). 17 June 2010.

[9] "Conergy deploys 3 MW solar PV power plant in India".renewableenergyfocus.com (Itnal, Belgaum District, Karnataka, India). 21 April 2010.

[10] http://www.renewindians.com/2013/02/indian-renewable-installed-capacity-has-reached-27.7GW.html

[11] " Cumulative deployment of various Renewable Energy Systems/ Devices in the country"

[12] "World Wind Energy Report 2008"

[13] "State Wise Installed Capacity". Retrieved 2 February 2014.

[14] India to add 6,000 mw wind power by 2012; but below target

[15] "Renewable energy achievements". Retrieved 2 February 2014.

[16] "World-Bank Backed Azure Starts Up Solar-Power Plant in India". Bloomberg. 8 June 2011.

[17] "Tata BP Solar installs first plant in Tamil Nadu". The Times of India. 8 July 2011.

[18] "Indian Wind Energy & Economy". Retrieved 2 February 2014."

[19] http://www.tata.com/article.aspx?artid=pfG3q5JjhJU=

[20] "Green Infra Limited sets up its first 10 MW solar photovoltaic power plant in Gujarat – The Economic Times". The Times of India. 16 November 2011.
AP TransCo Retrieved on 2013-12-06.

[21] Rajasthan is second state to cross 500MW capacity mark. PV-Tech. Retrieved on 2013-12-06.

[22] Progress under Jawaharlal Nehru National Solar Mission

[23] "Global Wind Energy report"

[24] "MNRE India"