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A Review of Distribution Generation(DG)

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ABSTRACT :- Distributed Generation (DG) is important for electricity in the world. In India, DG is also using in Power Sector as a Renewable energy. In this Paper, we are working for Distributed Generation(DG) and introducing the achievement and program of DG in India. We are also focusing at the renewable energies because renewable energy plays a significant role in generating electricity and clean country. Grid connected based Distributed Generation (DG) in off mode produce some issue which can resolve by use more efficient and reliable Distributed Generation.

Keyword:- *Distributed Generation (DG), ministry of renewable energy resources (MNES), Distributed Energy Resources (DER).*

I. INTRODUCTION

On its way to realize energy sustainability, India is awakening to the reality of need for using multiple energy sources. In order to achieve energy sustainability India has to create and exploit a mix of both traditional and contemporary energy resources. This objective is infested by number of serious problems including, widening supply demand gap, assessment of current and future energy requirements, overhauling the system in place etc. one of the most critical issues is the transition from currently used unidirectional system to that of a hybrid system. The hybrid system will result from diverse sources of energy and creating a synergetic interface between all these channels of energy is an overwhelming task. In doing so, existing infrastructure has to be incorporated with new projects especially alternate source of energy. A glimpse from past energy technology management practices can provide important insights for future. On one hand, the new system can incorporate the existing centralized energy production from local resources. Whereas on the other hand, the new system can distribute energy to geographically spread out localities. As a result, the new system integrates local production of energy as well as distributed demand of energy. By tapping in local resources to produce energy, the system can leverage site-specific benefits, where local energy fulfills local demand hence resulting in zero net demand. In order to add to energy stock, India can deploy advanced technology to exploit local energy resources without causing deterioration to environment. Over last few years, India has favored centralized, large scale energy generation over on-site distributed power generation. However, the centralized system has now showing inefficiencies and its effectiveness is on the decline. India is heavily reliant on imports of fossil fuel to run its economy as most of its hydro power projects have depreciated. The strategy is effective as long as the international energy prices are low. However, the situation is changing drastically, where energy prices are rising internationally and local infrastructure is weak to support increasing energy needs. Therefore, it's the call of time to shift our focus from imports to that of a locally sustained energy infrastructure and system than reduces our reliance on international suppliers. With the successful proliferation of local energy sources, not only India will achieve energy stability but we will also save millions of dollars from costly transportation. Local energy generation has several lucrative benefits like less reliance on large power plants and environmental protection. With these benefits there are few costs associated as well, for example, local energy production will increase problems infrastructure control (grid station control) for India. The solution to this problem rests in the use of smart grids. Through smart grids, India can achieve efficiency in distribution of energy. Moreover, smart grids can provide India with an increased surety about quality and stability of energy supply. The implementation of local energy production coupled with smart grid system, India will be able to transfer into a decentralized system of energy management which is more reliable, environment friendly, efficient and accessible.

II. DISTRIBUTED GENERATION AND SUSTAINABILITY

The energy statistics provided by Ministry of New and Renewable Energy, India was producing 1362 MW of electricity at the time of its independence in 1947. In later years India has given great deal of deliberation for energy generation in the country. Consequently the generation of electricity as a source of power has increased many folds in recent years. In fact, according to the official figures the electricity power generation in India by 2010 was 164,509 MW. This energy production is divided into several categories including Hydro power 37,086 MW (25%), Thermal power 106,433 MW (65%), Nuclear power 4,560 MW (2.9%) and Renewable energy power 16,429 MW (7.7%). The contribution of energy from Small Scale Hydropower (SHP) is 2,820 MW. The growth in electricity production from 1970-71

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to March 2011 is evident by increase in installed capacity from 14,709 MW to 173,626 MWs. This capacity includes CAGR of 6.2% over the same period of time. The highest figures of CAGR are reported for Thermal power plants (7.1%), which are followed by Nuclear power production (6.1%) and Hydro power production (4.4%). By the year 2013, the installed capacity of electricity in the country has further increased to 211.766 GWs, which is world's fifth largest. In addition to this energy, the captive power plants are generating additional 31.5 GWs of electricity. Furthermore, the energy infrastructure also carries 88.55% of installed energy capacity from non-renewable energy and 11.45% of renewable energy capacity. Based on the exponential growth, it is extrapolated by the International Energy Agency that India will add 600 GW to 1,200 GWs of additional power production capacity by the end of 2050. India's appetite for energy is growing exponentially, as a result the resources that are being put to generate energy for this increasing demand of energy is causing worries both in-house and around the world. Although India is successfully increasing its energy growth and resources however, percentage of renewable energy is very little in the overall portfolio. By the end of December 2012, India has achieved an installed energy capacity of approximately 22.4 GW, which is based on renewable energy sources. However, this source of energy represents only 12% of the total installed capacity. As of India's objectives for 2017, increasing installed capacity of electricity by 30 GWs, the country has to increase the share of green energy sources. An increase in installed capacity thorough fossil fuel use will only add to the already complex and deteriorating problems being faced on environmental front. The non-renewable energy generation turbine plants will use fossil fuel and natural gas, both of which are detrimental for the environment. A shift towards renewable energy will utilize solar energy, wind energy, biomass cogeneration, which are more environmental friendly. The Indian government has given consideration to the use of Gas Powered engines for electricity generation because these engines are more environmental friendly and liquid fossil fuel. The policy shift from liquid fuel to gas powered engines and turbines is also going to increase the demand for gas powered turbines; hence local electricity can be generated in geographies where gas is available. The shift towards more environment friendly sources of energy is a strong commitment to the environment and future generations by India.

A. Solar Power

India's geography is highly suitable for generation of electricity through solar power. The region receives blistering sunlight throughout the year. Because of favorable sunlight and environmental conditions solar energy has great potential for India. In fact, there are some large solar projects being proposed in India for which 35,000 KM^2 area has been reserved in Thar Dessert, which will generate 700 GWs to 1,200 GWs of environmental friendly electricity. In addition, the policy statement for JNNSM has been announced by Ministry of New and Renewable Energy. According to this policy, 10 GW of electricity will be generated by utilizing solar power. 4 GW will be managed by centralized system whereas 6 GW will be managed by decentralized system through state governments. As its commitment to exploit solar energy, India announced 19 Billion Dollar project in 2009 to generate 20 GW of solar energy by 2020. The project is coupled with other important changes, for example, government buildings and offices, hotels and hospitals will require using equipment which is supportive of solar energy. In continuation of utilizing solar energy, India has launched National Solar Mission to generate 1,000 MW of electricity by 2013. Additionally, India has increased its electricity generation from 2.5 MW to over 1,000 MW of grid connected photo voltaic. By the year 2007, solar energy produced by India was less than 1% of total demand. Similarly, the Grid Interactive solar power up to December 2010 was only 10MWs. If we go back as far as 2005, the government supported solar energy generation was only 6.5 MW/year.

Things are improving on the solar energy front now with India is being ranked number 1 on the basis of energy generated per watt of installed capacity and an insulation of 1,700 to 1,900 Killowatt Hours. The increase in solar energy supply also resulted in 2010 by 25.1 MW and in 2011 by 468.3 MWs. The Grid Photo Voltaic has increased to 1,040.67 MWs in 2012 which India plans to increase to 10,000 MWs by 2017 and eventually to 20,000 MW by 2022. As Indian rural areas receive good sunshine and sunlight, therefore India is better off by electrifying its rural areas through solar energy. As an additional step to increase contribution of solar energy, the Indian government has installed 34th Jawaharlal Nehru National Solar Mission.

B. Wind Power

India is already a leader in wind power generation. As of 31 Dec 2012 the installed capacity of wind power in India was 18420 MW. Wind power accounts for 6% of India's total installed power capacity, and it generates 1.6% of the country's power. Most of the installed wind capacity is grid-connected [1]. The wind resources of India have been mapped (data from 1000 monitoring stations throughout the country). The average cost of generation (at the average load factor of 13.3%) is Rs. 5.14/kWh. This implies that several unviable wind turbines have been installed. This was due to the initial incentives based on capital subsidies and tax benefits due to 100% depreciation. Incentives were not linked to generation. Profit making companies set up wind farms to avail of the tax benefits. In many cases due to improper sitting, the actual generation and capacity factors were low.

There have been policy correlations. This resulted in a slow-down of capacity additions during 1996–1998 followed by a more sustainable wind capacity addition. The initial

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experience had many unviable wind machines being installed in a hurry to avail tax benefits without considering wind sitting issues. Many of the machines were designed for European wind regimes that are different from the Indian wind regime (more seasonal and monsoon driven). The MNES has tried to improve the capacity utilization through technology development and emphasis on micro-sitting. The MNES has established a dedicated research center for wind energy technology (CWET).India has a large wind resource assessment effort with more than 1000 wind monitoring stations. The wind energy pro operates commercially and is facilitated by the availability of innovative financing schemes from the Indian Renewable Energy Development Agency (IREDA). In order to promote wind, the government has provided several incentives like 100% accelerated depreciation. Many state governments have provided capital subsidies (Andhra Pradesh, Maharashtra, Karnataka up to 20%), sales tax exemption. Most utilities permit wheeling, banking and buyback (purchase price of Rs. 2.25/kWh in 1994–1995 with an escalation of 5% per year).

III. CONCLUSION

India is working for development of Distributed Generation(DG) with utilizing capacity of the power sector. In India, Government provides two ministries of government for the progress of Distributed Generation(DG). In this Ministry of Power is working at Rural electrification and ministry of new and renewable energy (MNRE) is working for development and progress of DG.

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