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A Complete Power Demand Distribution usingRenewable Electricity Generation System for India

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Abstract: ***In India the power request is becoming quickly step by step because of different expanding private, official and hierarchical structures which requires more force. Power age framework is overwhelmed by a crossover environmentally friendly power assets like breeze and sunlight based, around 35% from 2007 to work presently, still force closure is applied mandatory by the Indian Government. To work on the measure of force age to 100% with expanded warm, fossil-energized, and bio-gas power age is changed over into complete sun based, wind and warm including cresting choices. To satisfy the interest, the breeze limit is expanded from 35% into 100% by consolidating sun powered and warm. Consolidating different energy frameworks into remain solitary force network, the most powerful interest can be satisfied. This paper applied an application for blending different energy asset for expanding the force age and creation.***

Keywords **: *Power Generation, Energy Demand, Renewable Energy Demand, Fuel Generation, Energy Supply.***

I. INTRODUCTION

For some time the effects of climate change in our world have become apparent, and the reserves of our new burial fuels have been reduced, causing the fuel price hikes at all times. In the meantime, 93% of the electricity in Ireland is manufactured for people, with 59% fossil fuel waste. Also, about 89% of the fuel in Ireland is imported, and it is the most severe of the current economic situation. The problem faced by Europe today is an increase in imports. Moreover greenhouse Gas (GHG) is an increase, emission, and high and unstable energy prices. Global demand for solving global CO2 emissions focuses on the current energy system Global Greenhouse Gas (GHG) emission of 1970 between 78% 2010. This policy points to the existing change. These energies greatly increase the range of standard power supply and increase the chance of renewal of local action plans. This is the purpose of GHG energy. The challenges of national and continental energy systems are the renewable energy supplies

for future volunteer integration and balancing futures. The settings for the island, these challenges are still pronounced. All the islands in this world depend on the import of fossil fuels. This is because of the distant situation of the islands. The cost of transportation by the remote island is much higher. The price of fossil fuels has also increased. The economy of the island is also based on tourists. There is a greater impact on energy demand and structural variation. Renewable energy (RE) technologies offer a solution. And this technology provides sustainable and self-sufficient energy. However, it is possible to balance the fluctuations in mediating power supply. In order to understand the existing renewable energy sources the taxonomy is given in Figure-1.

In the past years, the North East Asian countries are stimulating economic growth and the need for fossil fuels-based energy demand. Environmental and social issues continue to increase as continuous destruction of the ecosystems worldwide has increased. Importantly, this causes a shortage of fossil fuels. In particular, this situation leads to climate change, which is affecting the growth of the country's economy. Universal Stan Completed.

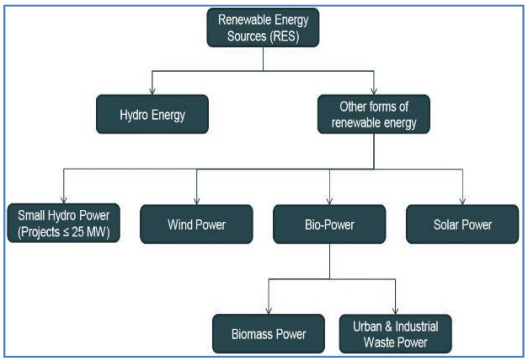

Figure-1. Taxonomy of Renewable Energy Sources

The harmful effects of coal-based air pollution should be considered for the supply of energy for entire social expenditures. These problems are 100% efficiency based on renewable energy (RE) and a universal level of competing fordebate and a contrasted dispute. RE-based systems can significantly reduce the anthropogenic path using the most important RE technologies continuous strong growth and the
majority of countries show their policies in the world. Displays of the highest stock-based energy systems in RE many countries and regions have already been discussed. OnMarch 11, 2011, in Japan, a major earthquake struck on the northeast coast. Its speed is 9.0 at sea level at the Richter scale. This tsunami caused a great disaster. Furthermore, this tsunami overwhelmed the 400-km-2 land of the northeasterncoast of Japan, causing more casualties.

The maximum waterfall in this tsunami was 19.5 m in height, about 4 km long. The maximum run-up is 40.4 m, making it the third largest tsunami in the last decade. Many well-designed concrete structures have been damaged by any tsunami, and many ships are shattered. Tsunami has also destroyed the security systems in Fukushima. The Dai-Ichi nuclear plant (NPP) has created a state of emergency to demolish this position. Earthquake and nuclear accident continue to be 30% of Electricity is not provided. None of the
50 nuclear plants are operating. However, many units eventually started to function.

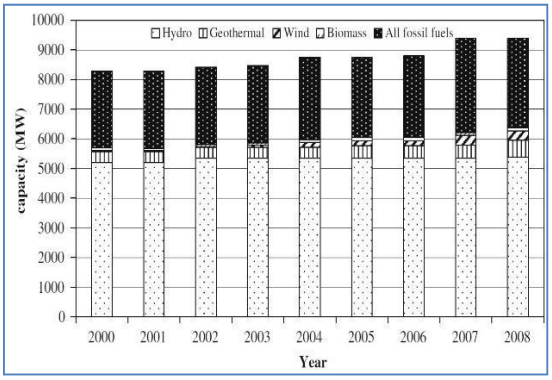

Figure.2. Operational Indian Power Generation (2000 to2008)

Current development of the energy system simulation identifies and assesses the credibility of 100% renewable electricity for five states and the challenges posed by the Australian NEM. Global warming emissions should be reduced by 2050. The current climate science suggests that this global gas emission should be reduced sharply. This instruction is 2GC (IPCC, 2007) prevents global warming. The International Energy Face (2011) states that, 80% of total emission emissions are permitted in 450 of its scenes for millions of views. Without any modern countries, poverty cannot be significantly reduced massive energy use, and with high returns and higher countries, the Human Development Index will be of high potential consumption. Therefore vital energy is essential for electricity, transportation or any other use. The most important aspect of Nigeria is the development of energy development and its development. Because, these privileges are a trade commodity for national revenue and it is used to support the government hopeless plan. Nigeria's energy demand increases very much. Because of the population explosion, inevitable industrialization, improving higher agricultural production and living standards. Nigeria has a large number of primary energy sources to meet currentand future development needs.

II. RELATED WORK

Authors in [1] said that, since 2010, the most prominent national and international advocate for IPCC and the German Council for Environmental Advisers are replaced by substantial contribution to renewable energy sources for future global energy supplies, or 100% Germany, and North Africa. Some governments, such as Denmark or Germany, continued by adopting the most ambitious targets for long-term use of renewable energy sources, the European Union also finds an opportunity for Europe to provide renewable energy in 2050, a change in the initial policy of the policy that represents a fundamental pioneer. Authors in [2]

described, there is no question of solutions to some of the problems solved by CCS or nuclear power, one question suggests that renewable energy sources can provide a long-term sustainable, low risk, and climate-friendly electricity, including the use of fossil fuels and nuclear energy. Energy is a limited supply source, high energy consumption, and high population Density, such as Germany, has a population of 229 hp/km 2 density (F11) and power consumption of 6200 kWh / cap. The solution to these two problems is that a 100% renewable power supply is a solutionto the two issues, the largest contributory power generation for climate change and the remaining risk nuclear power plantoperations. Authors in [3] said that, without any modern countries, poverty cannot be significantly reduced massive energy use, and with high returns and higher countries, the Human Development Index will be of high potential consumption. Therefore, vital energy is essential for electricity, transportation or any other use. The most important aspect of Nigeria is the development of energy development and its development. Because these privileges are a trade commodity for national revenue and it is used to support the government hopeless plans. Nigeria's energy demand increases very much. Because of the populationexplosion, inevitable industrialization, improving higher agricultural production and living standards. Nigeria has a large number of primary energy sources to meet current and future development needs. Author Rio PD (2011) [4], said that for some time the effects of climate change in our worldhave become apparent, and the reserves of our new burial fuels have been reduced, causing the fuel price hikes at all times. In the meantime, 93% of the electricity in Ireland is manufactured for people, with 59% fossil fuel waste. Also, about 89% of the fuel in Ireland is imported, and it is the mostsevere of the current economic situation. The problem faced by Europe today is an increase in imports. Moreover, greenhouse Gas (GHG) is an increase, emission, and high and unstable energy prices. Global demand for solving global CO2 emissions focuses on the current energy system Global Greenhouse Gas (GHG) emission of 1970 between 78% 2010. This policy points to the existing change. These energies greatly increase the range of standard power supplyand increase the chance of renewal of local action plans. Thisis the purpose of this energy.

Authors in [5] described that, the challenges of national and continental energy systems are the renewable energy suppliesfor future volunteer integration and balancing futures. The settings for the island, these challenges are still pronounced. All the islands in this world depend on the import of fossil fuels. This is because of the distant situation of the islands. The cost of transportation by the remote island is much higher. The price of fossil fuels has also increased. The economy of the island is also based on tourists. There is a greater impact on energy demand and structural variation. Renewable energy (RE) technologies offer a solution. And this technology provides sustainable and self-sufficient energy. However, it is possible to balance the fluctuations in mediating power supply. Authors in [6] explained, in the world, renewable energy production in Europe is growing rapidly. The European Union called its 20-20-20 goals in all countries in 2006 for renewal of 20%. So far 40% of restructuring has been completed.

In 2050, 100% renewal will be completed. But it is expected to be the year before. 100% is still substantial uncertainty. It can be revived by the largest contribution of air circulation and PV, because the water biomass and waste resources are very low. This requires a maximum of 100% energy from the wind and sun. This requires the next generation. Stability is the main goal in today's world. We are able to obtain greater stability from the cost and efficiency of economically efficient utility. This reduces the cost of fossil fuels. In the developing world, an era of cheap fossil fuels ends due to the increase in consumers and complex political situations (oil and natural gas). In this situation, renewable energy distributed around the world is considered a standard solution. The use of renewable sources in many communities is a necessity and a special need. A report given in [7], explained a method which reduces the cost of fossil fuels. In the developing world, an era of cheap fossil fuels ends due to the increase in consumers and complex political situations (oil and natural gas). In this situation, renewable energy distributed around the world is considered a standard solution. The use of renewable sources in many communities is a necessity and a special need. Lund H. et al. [8] said that the challenges of national and continental energy systems are the renewable energy supplies for future volunteer integration and balancing futures. The settings for the island, these challenges are still pronounced. All the islands in this world depend on the import of fossil fuels. This is because of the distant situation of the islands. The cost of transportation by the remote island is much higher. The price of fossil fuels has also increased. The economy of the island is also based on tourists. There is a greater impact on energy demand and structural variation. Renewable energy (RE) technologies offer a solution. And this technology provides sustainable and self-sufficient energy. However, it is possibleto balance the fluctuations in mediating power supply. Garnaut. R. (2011), stated that the Current development of theenergy system simulation identifies and assesses the credibility of 100% renewable electricity for five states and the challenges posed by the Australian NEM. Global warming emissions should be reduced by 2050. The current climate science suggests that this global gas emission should be reduced sharply. This instruction is 2GC (IPCC, 2007) prevents global warming. The International Energy Face (2011) states that, 80% of total emission emissions are permitted in 450 of its scenes for millions of views. Mori N. (2011) said that on March 11, 2011, in Japan, a major earthquake struck on the northeast coast. Its speed is 9.0 at sea level at the Richter scale. This tsunami caused a great disaster. Furthermore, this tsunami overwhelmed the 400-km-2 land of the northeastern coast of Japan, causing more casualties. Themaximum waterfall in this tsunami was 19.5 m in height, about 4 km long. The maximum run-up is 40.4 m, making it the third largest tsunami in the last decade. Many well-designed concrete structures have been damaged by any tsunami, and many ships are shattered. Tsunami has also destroyed the security systems in Fukushima. The Dai-Ichi nuclear plant (NPP) has created a state of emergency to demolish this position. Earthquake and nuclear accident continue to be 30% of Electricity is not provided. None of the

50 nuclear plants are operating. However, many units eventually started to function.

A. Problem Statement and Motivation

In this paper, the past years, India is stimulating economic growth and the need for fossil fuels-based energy demand. Environmental and social issues continue to increase as continuous destruction of the ecosystems worldwide has increased. Importantly, this causes a shortage of fossil fuels. In particular, this situation leads to climate change, which is affecting the growth of the country's economy. Universal Stan Completed. The harmful effects of coal-based air pollution should be considered for the supply of energy for entire social expenditures. These problems are 100% efficiency based on renewable energy (RE) and a universal level of competing for debate and a contrasted dispute. RE-based systems can significantly reduce the anthropogenic path using the most important RE technologies continuous strong growth and the majority of countries show their policies in the world. Displays of the highest stock-based energy systems in RE many countries and regions have already been discussed.

B. Strategy Adopted

In this paper a full integration of renewable power resources is introduced. All the wind turbines and other additional renewable energy resources are installed and integrated together. All the renewable energy resources are maintained in a same network. Also, this is possible when all the renewable energy resources are closer to all. The service support is globalised one. Most of the solar power generation companies are also converting their existing strategy into fully-integrated one.

III. DEVELOPMENT OF POWER GENERATION

In order to increase the power generation after investigating the impact of wind saturation in the power generation system, the renewable generation mixed. The system is built according to the following method:

1. Substitute the systems which are making problems by wind generation based on the energy generation.
2. Include any hydro scheduling, where the hydro system provides more power generation for compensating the variation in wind system.
3. If the capacity of the other energy resources is more than 771MW then, the remaining energy can be generated by wind system, where it can balance the total demand in thenetwork.
4. Like the above steps, the entire renewable energy system can add or remove the additional renewable energy resources.

$$CVC = \left[\frac{P_{fossil} - P_{backup}}{\Delta P_{wind}}\right]$$

Where, CVC represents the capacity value credit, P_fossil represents the capacity of the thermal (fossil-fuelled),

P_backup is the capacity stored as backup can be added and 〖ΔP〗_wind represents the wind power added. From the above expression, we can understand that the omitting renewable system unchanged the power generation.

$$\frac{P_{with} - P_{without}}{\Delta P_{wind}} = \left[\frac{\Delta P_{wind} + P_{backup} - P_{fossil}}{\Delta P_{wind}}\right]$$

$$\frac{P_{with} - P_{without}}{\Delta P_{wind}} = \left[1 + \frac{P_{backup} - P_{fossil}}{\Delta P_{wind}}\right]$$

$$1\text{-}\frac{P_{with} - P_{without}}{\Delta P_{wind}} = \left[\frac{P_{fossil} - P_{backup}}{\Delta P_{wind}}\right]$$

The results are expressed in terms of percentage (%). Hence the CVC value of wind is represented in %. From the basic energy generation, the 50% of the wind energy is increased by other renewable energy sources. The capacity of the total renewable energy generation is the sum of the wind power generation mixing with the other renewable energy sources. The % of the total energy generation varies in winter season due to solar, in summer season due to wind. The amount of power generation is always increased by adding various additional wind generation into the closed system according to the CVC value.

A. *Penetration of Wind*

To compare the results by calculating and employing the wind penetration using the following three equations as,

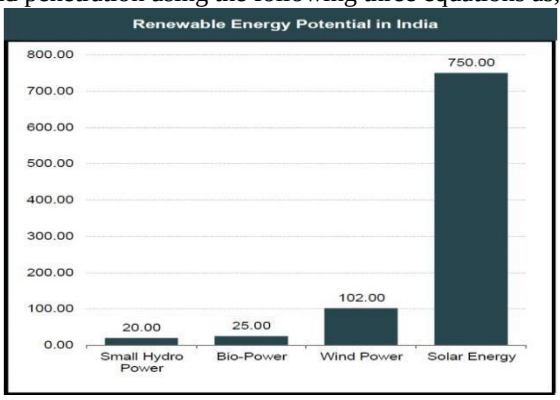

Figure.3. Potential of India in Energy Production

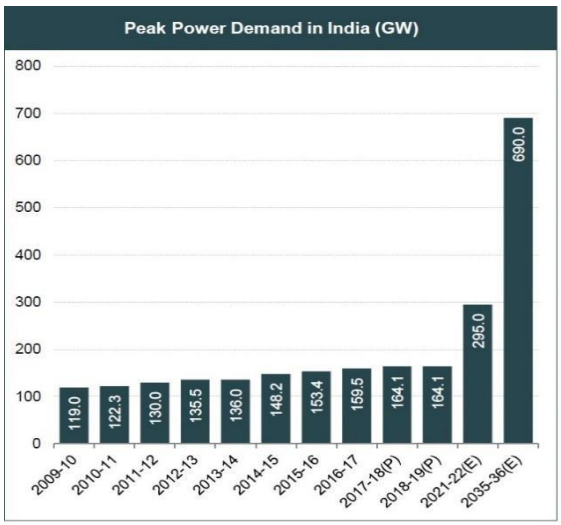

Figure.4. Changing India Towards RES

$$WP\ (installed) = \left[\frac{Wind\ installed\ capacity}{total\ network\ installed\ capacity}\right]$$

$$WP\ (average) = \left[\frac{Annual\ wind\ energy\ produced}{Annual\ total\ energy\ demand}\right]$$

$$WP\ (instantaneous) = \left[\frac{Wind\ Power\ Output}{Total\ energy\ output}\right]$$

It is also noticed the definition of wind power generation from "'wind installed capacity as a percentage of peak network demand''.

India estimated the potential of energy generation totally is 900GW from commercial sources. From the total, solar is 750GW, Bio-energy is 25GW, wind energy is 102GW and small hydro is 20GW. From the energy generation values, it is recognised that a target of 175GW of renewable energy capacity will be obtained in 2022. In India the estimated potential is 8000MV from tidal energy, which is represented in Figure-4.

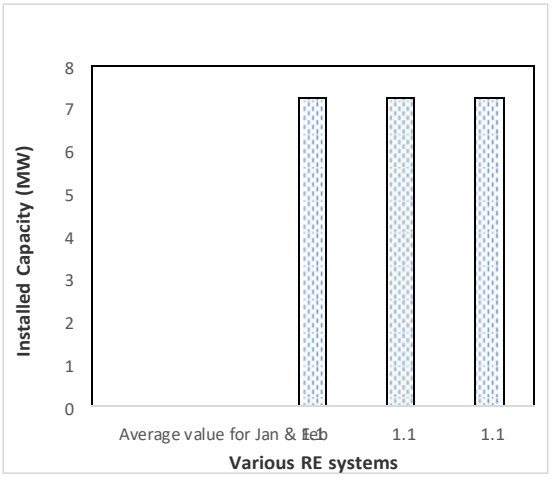

Figure-5. Installed Capacity India

From various studies obtained by a detailed literature review, it is concluded that the installed capacity and the limited capacities can fulfil the power demand in India. In this scenario only up to 2020 the power demand is predicted basedon the installed capacity of the renewable energy system. It ishighly impossible to fulfil the power demand without any renewable energy sources. Hence the installed capacity of the renewable energy systems is calculated and the results is given in Figrue-5. In this Figure-5, it is given that 850MW of thermal power, 900MW of Hydro power, 650MW of coal power1500MW of solar power and 1800 MW of wind power is installed in India.

Though high amount of power demand is required and installed in India, based on the grid connection, bus capacitiesthe power flow is limited in the network. 390MW of solar, 110MW of wind, 380MW of SHP, and 160 MW of biomass isconnected in the grid for power flow. It is given in Figure-6. To avoid power leakage, wastage, and reduce the cost and improve the power flow, any optimization methods are used for improving the power flow in power grid network.

Similarly, the cost of the RES is calculated and given in Figure-7.

IV. CONCLUSION

High amount of power generation is obtained by mixing thepower generated using different renewable energy sources together in a grid or in a network. All the possible renewable energy resources are integrated for increasing the power generation where it fulfils the power demand in India. In this paper the wind power source is considered as the main source and other sources are taken as the additional sources. 50% of the energy generation is obtained from additional resources. Failure or un-success sources are replaced by wind systems. Power generation is increased mainly using wind turbine. This paper provides a fully integrated approach where it helps to integrate all the renewable energy resources. From the analytical approach the potential energy generation of India isgiven. The data is collected from Indian Government resources and produced. From the analytical output it is clearly noticed that the power generation is potential only by integrating all the available energy resources.

In future work the suitability of the cheapest energy resources is integrated for increasing the power generation with cost effective..

REFERENCES

1. European Commission. Energy Roadmap 2050. (COM (2011) 885 final of 15 December 2011) Luxembourg: Publications Office of the European Union; 2012, 21. doi:10.2833/10759.
2. Federal Environment Agency, ed. Submission under the United Nations Framework Convention on Climate Change and the Kyoto Protocol 2011 National Inventory Report for the German Greenhouse Gas Inventory 1990–2009.
3. Sambo AS. Renewable energy for rural development: the Nigerian perspective. ISESCO 2005; 1:12–22.
4. Rio PD. Analyzing future trends of renewable electricity in the EU in a low carbon context. Renewable and Sustainable Energy Reviews 2011; 15 (5): 2520e33.
5. IPCC. Climate change 2014: synthesis report. In: Pachauri RK, Meyer LA, editors. Contribution of working groups I, II and III to the fifth assessment report of the intergovernmental panel on climate change. Geneva (Switzerland): Core Writing Team; 2014.
6. EU Commission. Commission of the European Communities: renewable energy road map: renewable energies in the 21st century: building a more sustainable future, communication from the commission to the council and the European Parliament 848.
7. BMU-BMWi Germany. Energy concept for an environmentally friendly, reliable and affordable energy supply, https://www.bmwi.de /Redaktion/ DE /Downloads /E /energiekonzept- 2010.html.
8. Lund H, Duic N, Krajacic G, Carvalho MG. Two energy system analysis models: a comparison of methodologies and results. Energy 2007; 32(6):948–54.
9. Garnaut, R., 2011. The Garnaut Review 2011: Australia in the Global Response to Climate Change. the Cambridge University Press.
10. Mori N, Takahashi T. The 2011 Tohoku Earthquake Tsunami Joint Survey Group. Nationwide Post Event Survey and analysis of the 2011 Tohoku Earthquake Tsunami. Coast Eng J (JSCE) 2011;54(1).
11. International Energy Agency. World energy outlook 2014. Paris: IEA Publications