

# Impact of Renewable Energy Sources on Power System

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**Abstract:** Renewable energy source (RES) is applicable in most cases. Among different RES like wind, solar, biomass, hydro, etc. Wind energy is the most available and utilizable one. Wind energy is used for electric power generation. With respect to wind energy stabilization is one issue.

Integrating wind energy with power system requires the application of power electronics devices and controllers. These devices help to improve the quality of power generated. Wind energy is one of the most available and utilizable forms of renewable energy. There has been an extensive growth in the utilization of wind energy in recent years. Among the different renewable energy sources, wind energy has emerged as the most possible source of electrical power. The grouping of wind energy into existing power system presents a practical challenges and that requires indication of voltage stability, regulation, power quality problems, etc. So renewable energy resources (RES) are being connected to the distribution systems, mostly done by use of power electronic converters.

**Keywords:** Renewable energy source (RES), electric power generation.

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## 1. INTRODUCTION

Electrical power is the most widely used source of energy for our homes, work places and industries. Population and industrial growth have led to significant increases in power consumption over the past three decades. Natural resources like coal, petroleum and gas that have driven our power plants, industries and vehicles for many decades are becoming depleted at a very fast rate. This serious issue has motivated nations across the world to think about alternative forms of energy which utilize inexhaustible natural resources. Renewable energy like solar, wind, and tidal currents of oceans is sustainable, inexhaustible and environmentally friendly clean energy. Due to all these factors, wind power generation has attracted great interest in recent years. Undoubtedly, wind power is today's most rapidly growing renewable energy source.

Wind energy is one of the most available and utilizable forms of renewable energy. Among the different renewable energy sources, wind energy has emerged as the most possible source of electrical power. The grouping of wind energy into existing power system presents a practical challenges and that requires indication of voltage stability, regulation, power quality problems net. The problem of power quality is of great meaning to the wind turbine. There has been an extensive growth in the utilization of wind energy in recent years. Renewable energy sources rely on highly complex physical processes which are hard to predict to a high degree of accuracy. Electricity generation from wind, for instance, relies on physical processes involving the interactions of innumerable air molecules, the Moon's gravitational pull and thermodynamic quantities. As such, providing a predictable power output from these sources is extremely tricky.

Distributed generation (DG) is termed as the integration of Renewable energy source (RES) at the distribution level. The number of distributed generation (DG) units, including both renewable and nonrenewable sources, for small rural communities not connected to the grid and for small power resources connected to the utility network has grown in the last years. The integration of renewable energy systems (RESs) in smart grids (SGs) is a challenging task, mainly due to the intermittent and unpredictable nature of the sources, typically wind or sun. So for the reliable operation of the system, continuous control is needed. This can be obtained by the help of digital control and power electronic devices that can improve the power quality of the system at the PCC.

## 2. RENEWABLE ENERGY SOURCE-WIND ENERGY

The wind speed will not be same throughout the year as it changes with different weather conditions. Estimation of annual wind distribution is an important factor regarding wind turbine output. So the average wind speed for a short time depends not only on annual wind speed but also on wind distribution. Wind turbines are expensive to build and maintain. The wind field from which they generate power is also the source of large fatigue loads on the turbine, which create structural wear and tear, increasing maintenance costs and decreasing the operational lifetime of the turbine. These costs are significant, and dramatically impact the profitability of the turbine. Wind turbines are designed to produce electricity as cheap as possible. For this purpose, wind turbines are, in general, designed to yield a maximum power output at wind speeds around 15 m/s. It would not pay to design turbines to maximize their power output at stronger winds, because such strong winds are usually too rare. However, in case of stronger winds, it is necessary to waste part of the excess energy to avoid damage on the wind turbine.

## 3. CONCLUSION

Renewable energy sources (RES) are getting attractive now a day as the conventional fossil –fuel energy sources are diminishing day by day. Generation of electric power is possible through RES. RES is abundant in nature and is free of cost. It is considered as the environment friendly one. While integrating RES to the grid system, some issues occur due to unpredictable nature of sources.

A continuous control is necessary for reliable operation which is obtained with the help of power electronic devices and controllers. Power electronics have developed much which contribute for the reliable Operation. A number of technologies and concepts are linked under the banner of grid interconnection. Renewable-energy resources vary widely in type. Renewable-energy resources can be used for standalone or islanded (system isolated) power generation, but their benefits are greatly enhanced when they are integrated into broader electric power grids. With greater use of smart grid technologies, higher degrees and rates of penetration can be accommodated. Each resource is different from the grid's perspective and some are easier to integrate than others.

Renewable generation has the benefit of enhancing sustainability (reducing environmental impacts), reducing greenhouse gas (GHG) emissions, reducing dependence on local or imported fossil fuels, and increasing energy security through diversification of energy sources. Variable generation, provided by many renewable-energy sources, can be a challenge to electric system operations, but when used in conjunction with smart grid approaches, responsive distributed generation also can be a benefit to system operations if coordinated to relieve stress in the system (e.g., line overloads, etc.). Grid interconnection approaches can reduce barriers and facilitate integration of renewable resources.

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